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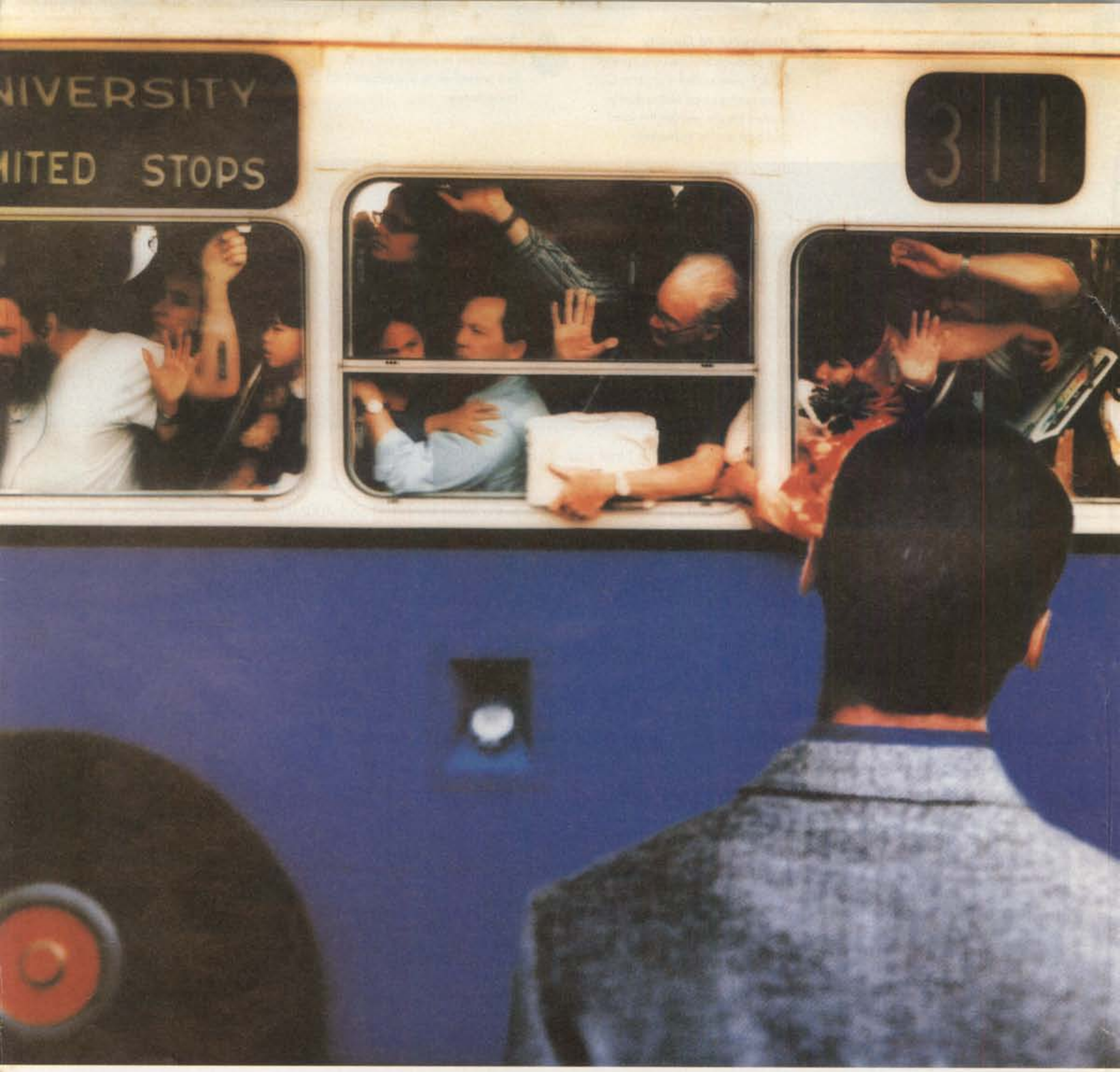

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Think of a number

Microsoft has tied itself in knots over version naming, so it helps to think of the latest Windows as 4.1.

By Jeremy White

Naming software is an odd business, and Microsoft over the past five years has taken an odder approach to it than most. Word, for example, jumped from Word 5.0 for DOS to Word for Windows 1.0 then 2.0, and then as part of Office Professional 4.0 it became Word 4.0, then as part of Office 95 it became Word 95 (which, from memory, was internally named Version 7.0). Now I'm running Word 97 which, I think, is Word 8.0. Forgive me if I've muddled them up, but you can see why.

The longstanding tradition in technology nomenclature was to take the build or version number used internally for the product's brand name. This didn't just apply to software. As most people who have been around pre-Pentium would know, the 80286/386/486 series were processor numbers. But you can't trademark numbers. Anyone can make a product called a 586. And as your customers become less technical, the 486 or 586 designation becomes harder to explain, especially when you combine it with a clock speed.

I recently had a chat with non-technologically inclined chap who found the entire system pretty bizarre. It is. How would you tell which is faster when they have names like 486DX4/100 and Pentium 60? So perhaps it did make sense for Intel to switch to a more consumer-friendly word, like Pentium. But then what does it call the next release? Pentium Pro. Then it releases Pentium MMX, and then the Pentium II. Weird.

If three iterations of the same system in sequence makes a trend, then it's difficult to find any trends recently in big-name technology products. When nomenclature was based on version numbers, it may have been more difficult to brand, but at least at core it made sense. Version 3.0 to Version 4.0 of Product X was a big step. A point release from 3.0 to 3.1 was a little step, and 3.1 to 3.11 was an enhancement.

Those little numbers say a lot more than an increasing number of people probably realise. And, of course, those little numbers are still what software and hardware companies alike use internally when developing their products.

I've been running the first 'final' version of Windows 98 for a few weeks, the so-called RC0 (release candidate zero). It's interesting to me that the build number on this version is 4.10.1691. That says to me that this is Windows 4.1. Windows 95 was Windows 4.0, with similar sequences of build numbers, and was referred to as Windows 4.0 in the media for a long time before release.

In the history such that it is of Windows, Version 3.0 was a big step from Version 2.0 and 1.0, which didn't have much between them. The biggest functional improvements for the user came, ironically enough, in the jump from Windows 3.0 to Windows 3.1, and then reasonable improvements again in Windows 3.11.

While the branding being used for Windows 4.1 may be a grand-sounding jump from Windows 95 to Windows 98, the real significance of the improvements is not so great. As Microsoft internally clearly knows well and truly, this is a point release, not a major overhaul.

Nonetheless, the shift from Windows 3.0 to 3.1 offered reasonably significant end-use improvements, and I think the same can be said for the shift from Windows 4.0 to 4.1.

The combination of proper 32-bit FAT, GDI interface speed improvements, and the smart grouping of applications together on disk produces a real impact on the overall perceptible speed of the operation of your PC, especially on 166MHz or slower systems. The impact on a P90 is noticeable. There's not much that you can do to speed up a P90 these days that is noticeable!

There are greatly improved maintenance and scheduling tools, the Plus elements like Desktop Themes are now all part of the standard OS, and lots of smaller improvements, such as handling for power management profiles for desktops and notebooks, aren't revolutionary but still offer real benefits to users.

On the downside, the politically inspired Active Desktop or Web Desktop is simply a disaster. It's unstable in the extreme, even in this close-to-final version. And when your browser dies, your PC dies. That gets annoying very quickly. The so-called Web integration may be one of the features most highlighted in the marketing, but don't be fooled into thinking it's a reason to upgrade. The much less sexy features proffer much greater benefits.

It's also worth keeping in mind that if you are interested in the Web integration and Active Desktop — and to be honest, they will be good when Microsoft stabilises them — you can get them already using Windows 95 and IE4. I suggest you steer clear of this particular feature until Windows 4.11.■

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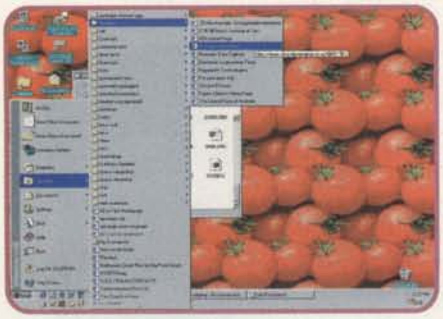

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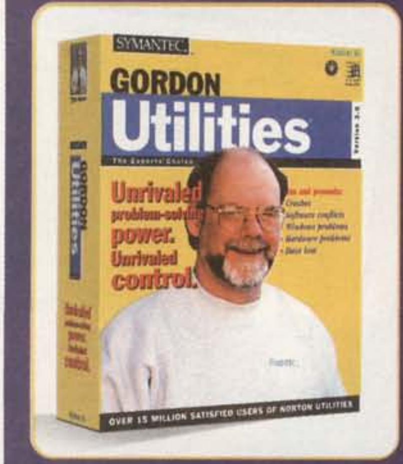
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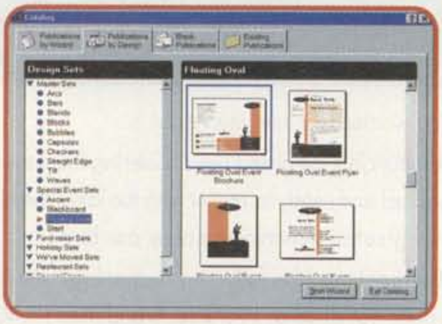

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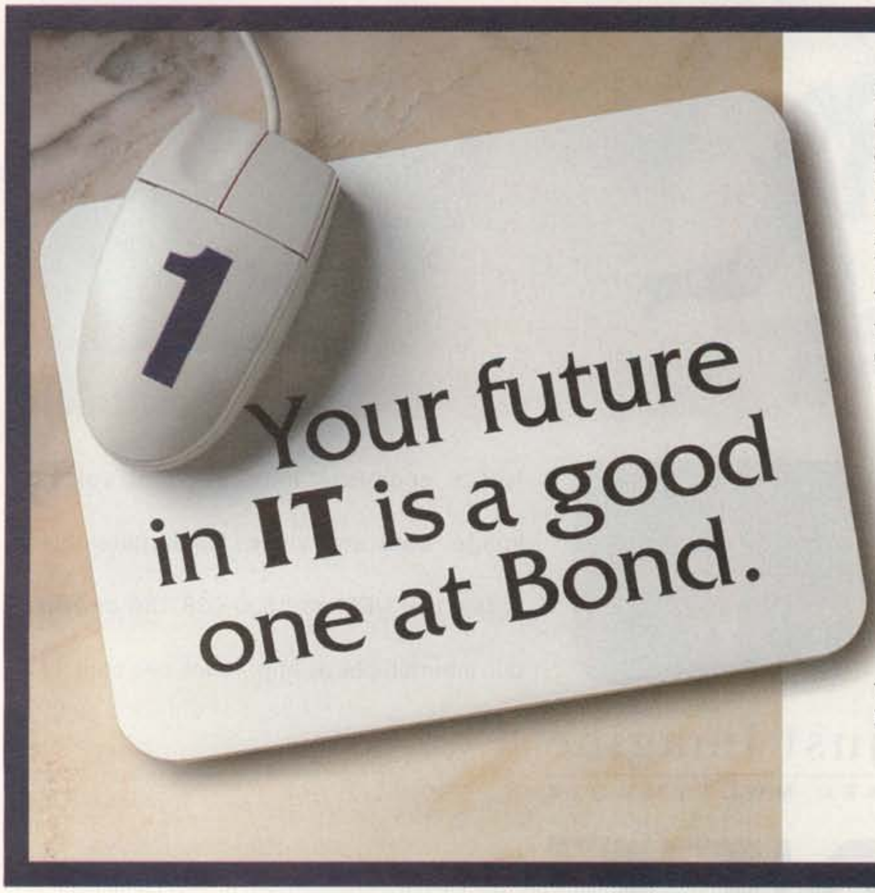

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Standard subscription rate:
Australia $65 per annum.

Distributed by Network Distribution Company,
54 Park Street, Sydney, 1028.
Telephone: (02) 9282 8777

Australian Personal Computer Magazine is published by ACP Computer Publications, a division of ACP Publishing Pty Ltd (ACN 053 273 546)

Printed by Hannanprint Pty Ltd.

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Newswire

UPSIDE DOWNSIDE

Mixed reaction to Asian meltdown

Ongoing currency problems in the Asian region are having a mixed impact on the world IT industry. Some sectors have seen a dramatic effect, while others, such as employment, are yet to experience any real impact. Experts are warning, however, that the long-term effects may not yet have become apparent.

While the overall market for PCs in the Asia-Pacific region experienced slight growth in 1997, the ongoing Asian economic crisis heavily impacted the end-of-year market and will continue to dominate for the foreseeable future, according to new research from the Gartner Group.

Total shipments in the 10 major Asia-Pacific markets (which excludes Japan) in 1997 were 8.7 million units, a 14.1% increase on 1996. However, revenues grew by just 0.4% to $US14 billion, and most of the unit growth occurred prior to the mid-year onset of the currency crisis.

Figures for the region (see table, next page) show that only three countries experienced negative growth over the year, but those figures conceal significant regional variants. For instance, shipments in Indonesia declined by 48% in the final quarter of 1997.

However, the Asian currency crisis has yet to dent Australian employment, the quarterly Drake International Employment Forecast has found. Approximately 45,000

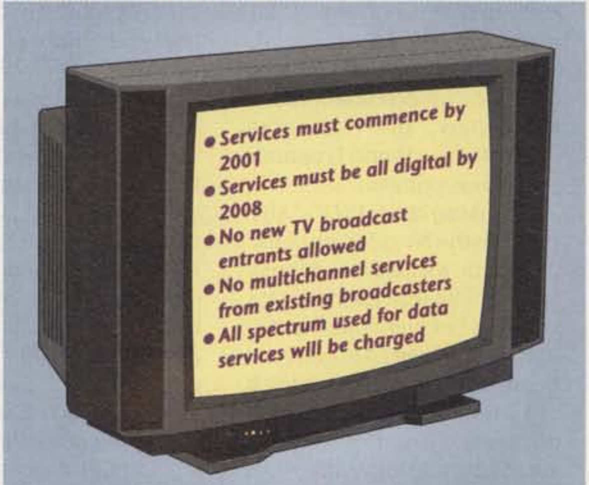
Continued on page 16

DATA DISAPPOINTMENT

Digital TV decision angers industry

The announcement that Australia's free-to-air television broadcasters have been granted free and exclusive broadcasting rights for digital television through to 2005 has angered many information industry players, who viewed the allocation as an important test of the Government's commitment to developing the local information economy.

Digital TV: The rules



- Services must commence by 2001
- Services must be all digital by 2008
- No new TV broadcast entrants allowed
- No multichannel services from existing broadcasters
- All spectrum used for data services will be charged

In a widely anticipated move, the Federal Government has granted the existing major broadcast networks — Seven, Nine and Ten — 7MHz of digital spectrum each, free of cost. The metropolitan networks must begin broadcasting on the spectrum by January 1, 2001, though they may commence earlier if they wish. Regional broadcasters must begin digital transmissions by 2004.

Under the deal, simulcasting on both analog and digital channels will continue for an eight-year period, after which broadcast networks are expected to be entirely digital and will be required to hand back their analog spectrum allocations.

Commercial broadcasters will not be allowed to use the spectrum to provide multiple analog channels rather than a single high-quality channel, and will not be allowed to charge for such services. In return, the restriction of commercial television licences to just three major players will also be maintained through to 2008, and possibly further, pending the results of a projected 2005 review of digital services. The ABC and SBS will also be given 7MHz of spectrum each, and may be permitted to offer multichannel services, although details have not yet been decided.

Continued on page 16

News Roundup

News of a deal between Intel and the Seven Network that would see the network use Intel's Intercast technology for broadcasting enhanced TV content caused a certain amount of consternation at Intel's Australian headquarters when suggestions were made that the deal excluded Australia's other TV networks. While Seven and Intel do have an exclusive agreement for Intercast, according to Seven's director of corporate development Graham McVean, at this stage it covers testing only. McVean said it was unclear which direction the company would take after testing was completed, and it was "all up in the air". He did agree, however, that an exclusive deal between Seven and Intel would be a suitable counterpoise to the NineMSN joint venture established between Microsoft and PBL, the publishers of *APC*.

It is undoubtedly that possibility which had Intel worried. "We see Intercast technology, which was developed by Intel, as an open system for use by the broadcasting industry generally," Intel's Australian managing director David Bolt said after the news broke. Tying up an exclusive deal with Seven would cut the company off from potentially lucrative revenue streams from rival commercial broadcasters Nine and Ten, as well as the ABC, which has the most developed Web presence of any Australian broadcaster.

Asia-Pacific PC shipments 1996-1997

Country	1997 shipments	Growth (%)
China	2,209,100	41.8
Korea	1,879,800	-2.9
Taiwan	702,800	38.3
India	450,200	-3.6
Singapore	416,600	28.8
Malaysia	400,500	19.7
Indonesia	387,700	-4.6
Thailand	337,000	0.8
Hong Kong	332,900	2.3
Total	**8,713,900**	**14.1**

Source: Dataquest

Mixed reaction to Asian meltdown

Continued from page 15

new positions will be created in the April-June quarter, up 0.5% on the previous quarter, with much of the growth coming from the IT and business services sectors.

The real losers have been the Asian nationals employed by Australian construction and manufacturing companies operating in South-East Asia, with 9.2% and 9.7% of businesses in each sector reporting a downturn in business.

The IT sector's 3.1% employment growth, in addition to the predicted 2.3% growth in business services, can be attributed to rising demand for Y2K solutions and the increasing number of companies undertaking intranet/Internet infrastructure projects. Graduate employment is also on the rise, a factor which is expected to balance a drop in IT sales into South-East Asia.

However, while economic crises in the Asian region have been heavily analysed by the media, most examinations have failed to take into account the effects of globalisation and technology, the managing director of the World Economic Forum has warned.

Speaking at the WEF's 'Australia in the Next Millennium' dinner in Melbourne, Claude Smadja said that the crisis represents a "tremendous theoretical challenge" to conventional economic theory, which did not make adequate allowance for the way in which technology advances such as the Internet had changed global trade patterns and opportunities.

The crisis should be recognised as the "first systemic crisis of the economy of the 21st century, which happened to occur in Asia," Smadja said.

Angus Kidman and Josh Gliddon

Digital TV decision angers industry

Continued from page 15

The main interest for IT industry players is in the allocation of excess spectrum for datacasting services. While broadcasters will be able to make data services available on excess spectrum, they will have to pay for that service, and spectrum will be made available at a price for other interested parties at the same time, Communications Minister Senator Richard Alston (pictured) said. No details of the datacasting plan were made public, although Alston emphasised that the data possibilities of digital TV are an important part of its overall appeal.

The move was met with anger by many industry bodies. "[We] are disappointed with the Federal Government's decision to give a scarce national resource to the free-to-air broadcasters," said Rob Durie, deputy director of the Australian Information Industry Association (AIIA). "It is in stark contrast to the Government's usual approach of ensuring fair and open competition."

OzEmail director of corporate relations Michael Ward said that the decision clearly indicated where the Government's priorities lie. "The Government has put free-to-air television ahead of any other use of the spectrum," he told *APC*. "It's missed the opportunity to get a head start in the datacasting industry."

Because allocation of spectrum not likely to be completed before the planned rollout of TV services in 2001, Australia would miss the opportunity to develop expertise in data services and would end up relying on imported products, Ward predicted. "It makes no sense," he said. "All the best spectrum is being given away while the scraps are being sold off to new businesses. They're trying to apply a broadcasting access regime to a potentially global service."

The Government has justified its decision by pointing to the high costs — estimated to be in the region of $500 million — the networks will pay for new digital production and transmission facilities. "Australia's free-to-air and pay-TV industries, in these special circumstances, deserve a degree of special treatment, and the Government makes no apologies for this decision," Alston said in a statement announcing the deal.

Angus Kidman

News Roundup

Proving that point, the national broadcaster has launched ABC News Online (http://www.abc.net.au/news), a dedicated Web news service with a heavily Australian focus. So far, 22 regional bureaus have been brought into the scheme, with the rest of the ABC's regional newsrooms coming online throughout 1998. ABC chairperson Donald McDonald emphasised the role the bureaus will have in news gathering, and said that all bureaus will contribute to the service.

● Despite considerable publicity, sales of network computers (NCs) weren't exactly red-hot during 1997, according to newly released figures. Research from Dataquest has found that 144,040 NC systems were sold last year. While Dataquest expects this number to more than triple to around 480,000 units this year, that's still a drop in the ocean compared with the global PC market, where more than 82 million machines shipped last year.

● Meanwhile, in a bid to add some impetus to their respective network computer (NC) pushes, IBM and Sun have announced plans to jointly create a Java-based operating system. JavaOS for Business will replace the existing JavaOS for NCs used by Sun's JavaStations and will also be used on IBM's Network Stations. Company officials said providing a unified OS platform would make it easier for inde-

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PROMISES, PROMISES

Timed data calls back on agenda

The announcement by the Coalition Government that it will sell off the remaining two-thirds of Telstra if re-elected has again raised concerns about the future availability of untimed data calls for Australian Internet users.

Untimed local calls have been held widely responsible for the strong growth of the Internet in Australia, since costs for connection are held relatively low under such a scheme. Telstra, though, has argued in the past that it should be allowed to charge users making local data calls, since these can last much longer than ordinary voice calls.

Telstra's preferred option is a so-called 'B party' charging scheme, where the connection costs are passed to Internet service providers rather than to the caller. However, ISPs have indicated that they would pass back such costs in the form of higher hourly fees.

In the past, the position of Senator Richard Alston, the Minister for Communications, the Information Economy and the Arts, on the issue has oscillated. When the March 1997 legislation to deregulate the telecommunications industry was being drafted, he refused to specifically bar B party charging. In October, he reversed his approach, barring B party charging on data calls going to ISPs. That provision, however, only carries through to 2000.

Questioned following the announcement of the sell-off plans, Alston said that any privatisation would include appropriate measures to ensure that key services remained accessible. "The whole purpose of having a regulatory framework is to be able to implement community safeguards," he said. He stopped short of giving a specific assurance that local calls would remain untimed, however.

Government documents have since made clear that while residential users would continue to be entitled to untimed voice and data calls, the same promise is not being extended to business users.

Angus Kidman

CATCH THAT BUS

USB: Where are the peripherals?

Over three years after the first announcement of the Universal Serial Bus, and with 5 million USB-enabled PCs shipped worldwide a month, the USB Implementers Forum is promising consumers that 1998 will see the large-scale introduction of USB devices.

Speaking at a presentation at CeBIT 98 in Hanover, forum chairperson Stephen Whalley said at least 150 new devices would appear in the coming months, and over 200 more pre-production devices would be tested at the next USB Forum device working group meeting.

While PCs that support USB have been available for over a year, the problem for consumers until now has been finding devices to attach to the port. About 50 products have been released since May last year, the majority of them videoconferencing cameras, said Whalley.

He predicted there would soon be 1 billion ports ready to install USB peripherals. From a desktop PC perspective, the rollout of the technology is complete, he said, and by the end of the year all notebooks shipped will include USB support. This will lead to growing demand for USB peripherals from consumers, he said, adding that the release of Windows 98 later this year will also accelerate the process (see page 70).

Walley noted the importance of USB to the scanner market. At present there is a 30% return rate on scanners, not because they are faulty, but because the user has been unable to install them. The simple installation process for USB-enabled scanners will mean fewer returns, he said.

USB was created by Intel, Microsoft, NEC, Compaq, Digital and Northern Telecom in an effort to standardise peripheral attachments to PCs, and improve the ease of use and speed of those devices. USB devices are ready to use when plugged in: a speaker system requires no soundcard, for instance. At 12Mbps, USB is up to 100 times faster than a standard serial port and about 10 times faster than a parallel port, supplying adequate bandwidth for devices such as virtual reality goggles, digital cameras, and so on. Up to 127 devices can be supported.

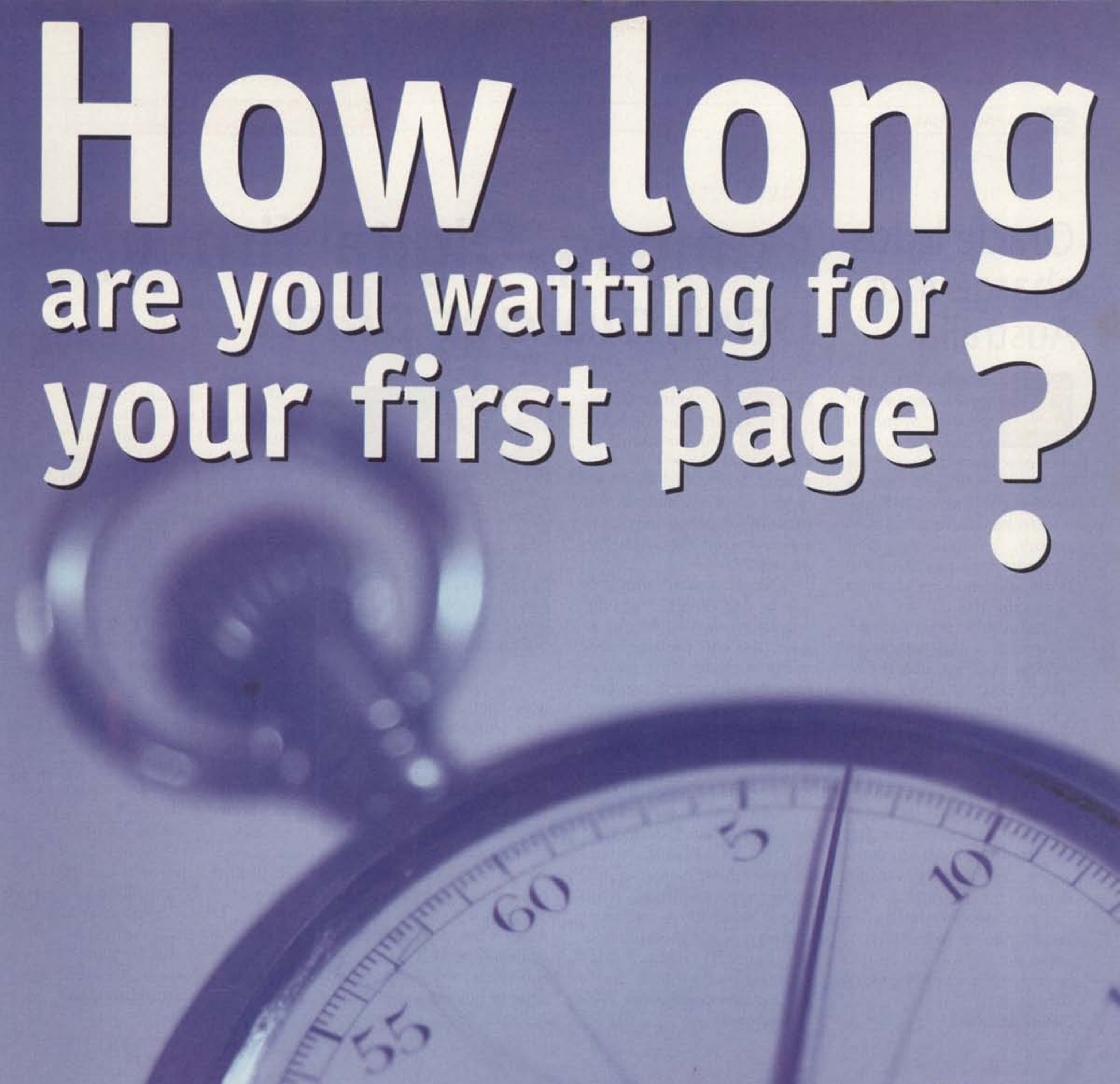
Selina Mitchell

News Roundup

pendent software vendors to develop business products for NCs. Under the arrangement, Sun will continue to develop Java-based OSes for the consumer market on its own. The product is scheduled for a mid-year release to OEMs, but is not expected to be widely available on systems before 1999.

● On a flying visit, Intel's CEO-elect, Craig Barrett, hinted that the processor giant was interested in establishing a chip fabrication plant in the Asia-Pacific region. A meeting between Barrett and Prime Minister Howard, along with Minister for Information, Communication and the Arts, Richard Alston, and several other members of Cabinet, considered the possibility of offering the company tax breaks as an incentive for the plan. No further details had been confirmed at press time, although it is believed that Intel will pass over Australia in favour of China.

Complete versions of all these stories can be found on the **apcmag.com** Web site. For regular updates on what's happening in the world of computing, check out our breaking news stories throughout the week Web site at http://apcmag.com/news. And don't forget our weekly Highlights from the Wire roundup, posted every Monday at http://apcmag.com/direct and available via email.



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LOCAL BOOST

Oracle leads charge into Australia

Australia's states continue to compete for industry. Sydney is to be home to Oracle's new research centre; the world's second-largest software developer will invest $48 million in its Australasian subsidiary, establishing new corporate headquarters and a National Centre for Network Computing there.

The decision to set up headquarters in Sydney will see the number of Oracle staff rise by 50% by 2002. As a result of the plan to set up in North Ryde, Oracle will establish a new call centre and an education and change management facility.

Oracle's COO, Ray Lane, said the decision is "Oracle's demonstration of the strategic importance of Australia in the region and its overall confidence in the marketplace".

"It is very important in these times to redouble your commitment. You can see it as a crisis or an opportunity," said Lane.

Selina Mitchell

SPLIT DECISION

Compaq, Digital firm up post-merger plans

The upcoming merger between Digital and Compaq will likely see their competing Australian build-to-order centres maintained, but with one exclusively devoted to servers and the other focused on desktop PCs.

And while some staff cuts will be "inevitable", regional operations such as the one in Australia will probably feel minimal effects, since most of the cuts will come in logistical areas such as human resources and finance, Digital's South Pacific managing director Ron Bunker (pictured) has predicted.

Although the two companies are in a legally-mandated "quiet period" before the $US9.6 billion merger is officially approved, Bunker did reveal some likely outcomes during a recent press briefing, although he stressed that nothing was set in concrete until global details have been agreed upon.

The question of how to deal with Digital's local PC business remains a key concern, since Digital's Australian PC Business Unit has outperformed its US counterpart by a considerable margin.

Bunker said that while the obvious solution would be to merge the two operations into one centre, that isn't necessarily the smartest choice. "It might make sense to have one plant building servers, where the process is very different, and have another doing desktops," he said. "Together, we have 50% of the international server market and we wouldn't want to do anything to violate that."

While he declined to comment in detail on staffing issues, Bunker predicted that around 90% of local staff would probably retain their jobs. "At the regional level, we don't expect much impact."

The greatest challenge is reconciling the differing enterprise cultures of the two firms, he added. "The logic [of the merger] is infallible, but the devil is in the detail . . . We don't in any way underestimate the magnitude of the task ahead. If you look at the history of [IT] mergers and acquisitions, it has not been a golden path."

Bunker sought to downplay concerns over the future of Digital-developed technologies, notably the Alpha processor, Digital Unix and the VMS operating system. The first two will continue to play a key role in Digital's server operations, he said.

Angus Kidman

NO DICE FOR CBT

Computer-based training still a flop

Although newly released figures indicate that training remains an important aspect of business spending, it appears that computer technology hasn't had the impact on the training sector many expected.

Figures from the Australian Bureau of Statistics (ABS) show that 61% of companies provided training for their employees in the 12 months ending February 1997. However, the vast majority of training provided was unstructured, typified by informal on-the-job training rather than planned, formal courses. Of employers providing training, 43% provided only unstructured training.

That preference may help explain why computer-based training (CBT) has had little impact in the training sector, despite advances in the past few years. The widespread deployment of CD-ROM drives has made the incorporation of multimedia straightforward, and more sophisticated testing and monitoring systems are also possible.

However, according to a survey of 500 employers recently released by training specialist Drake International, conventional instructor-led training in a classroom setting remains the most popular choice, with 74% of respondents favouring this mode of operation when teaching computer topics. Independent computer-based training ranked as a mere blip on the graph by comparison, utilised by just 4% of respondents. A similarly low 5% used intranet or Internet-based training.

Drake also found that 55% of companies had no intention of changing these methodologies, but that more than half of the 35% of employers providing structured training have increased their spending in the past 12 months.

Angus Kidman

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NEW ENTRANTS AT BARGAIN PRICES

Online CD sales battles heat up

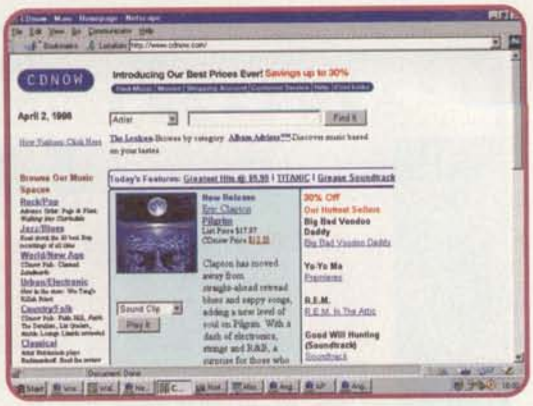
Selling CDs online may have been one of the early success stories for Internet commerce, but the question of the best way to sell music in the digital age and who the major players will be is still very much up in the air.

The success of companies such as CDnow (pictured) and Music Boulevard, which only exist as online stores, has led many to conclude that music, along with books, will be one of the first retail frontiers to be truly conquered by the electronic world. However, booming sales for bookseller Amazon.com were quickly met by major Web initiatives from conventional booksellers such as Dymocks in Australia and Barnes and Noble in the US.

Now it seems those battles are also moving into the music retailing space. Richard Branson, the managing director of the Virgin group of companies, recently announced plans to begin online sales under the Virgin banner. (Locally, Virgin's music retailing operations were merged two years ago with US giant Blockbuster.)

Unusually, while Branson plans to develop a single Web presence, the price of individual CDs will vary depending on where the customer buying them is located. Most existing online music retailers charge the same price to all customers, but add extra postage and handling charges for international users.

Whether Branson's globally-divided approach would work in Australia is questionable, due to considerations of both market size and demarcation. For instance, the Australian arm of rival retail chain HMV is currently engaged in an argument with its parent company in the UK over how to develop Web initiatives. HMV UK wants to host and develop all Web-based commerce out of the UK, while the local operation wants a locally hosted and developed commerce site, a spokesperson told *APC*. The UK site currently has no ecommerce capability, while there is no Australian site at all.



Certainly, locally focused online sales haven't been a major success in the Australian market. One prominent local CD selling venture, CD-Online, closed its doors in October last year, unable to sustain itself in competition with international retailers.

A further complication is the ongoing battle over whether or not parallel importation of CDs from overseas should be allowed.

Changes to the parallel importation laws would likely see the price advantage of online selling eroded, but online retailers have at least three more aces up their sleeves. The first is the ability to offer a wider range of music than a retail store can afford to carry. The second is the increasing use of the Web as a promotional tool, allowing customers to sample music before purchasing it, and, increasingly, before it is actually available as a commercial release.

The third advantage is the ability for users to customise their music ordering. An early pioneer in this area has been Cerberus, whose 'digital jukebox' system allows tracks to be downloaded online, subject to a payment. Conventional retailers can also benefit from such customisation systems, of course. Melbourne music retailing icon Gaslight Records, for instance, plans to begin using Cerberus' technology this month to allow visitors to its store to custom-burn their own CDs.

Angus Kidman and Josh Gliddon

ONE FORWARD, TWO BACK?

Howard talks down technology's role

Despite recent victories in increasing IT investments by major companies in Australia (see page 20), it seems Prime Minister John Howard is yet to be entirely convinced of the virtues of an information-based economy.

In his vision of 'Australia in the Next Millennium', presented at a World Economic Forum dinner in Melbourne in March, Howard heavily downplayed the role of technology.

He ranked its development fourth in a listing of six priorities, behind securing economic fundamentals, promoting an attractive investment climate and extending trade policies, but ahead of non-economic millennial change priorities and the protection of the environment.

On the subject of the information economy, Howard emphasised Australia's role as an early adopter of technology and highlighted the success of the Telstra float, but offered no new insights into how governments would help develop Australia as an information economy player.

Reflecting his conservative stance, Howard did take time to warn of the dangers of technology. "In the emerging world of mesmerising computer wizardry, we are committed as a government to building a community in which the interests of people rather than the interests of technology prevail," he said. "The two, of course, are not mutually exclusive and at their best can be mutually reinforcing. But there is a distinction which needs to be recognised."

Angus Kidman

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(OK, ENOUGH ABOUT ITS WEAK POINTS.)

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THE BIG SWITCH

Last train to Geyserville

Intel plans to follow its launch of the Pentium II for notebooks (see page 29) with several new platform initiatives for mobile systems. The most significant of these is Geyserville, a power management initiative that will help to overcome power problems with higher-end processors.

While battery capacity is remaining fairly constant, the consumption of power by processors continues to rise as transistor counts increase. Geyserville overcomes this by switching modes according to whether the notebook is plugged into an A/C outlet or docking bay, or whether it is running off battery power. Initial models will, for instance, operate at 350MHz when running off the battery, and at 450MHz when running off a power outlet. Fan operation will also be switched on and off.

Nathan Taylor

SHRINK IT, SLICE IT

Medicine draws on IT

It might sound like something out of Isaac Asimov's *Fantastic Voyage*, but before the next century rolls over it's quite likely that your local hospital will have an expert system assisting the medical staff.

Local company Polartechnics, in conjunction with the CSIRO and St Vincent's Hospital, has spent the last five years developing expert systems that can diagnose cervical and skin cancers. (Expert systems use rules and general principles to mimic the behaviour of human experts, and are one of the foundation tools used in artificial intelligence.)

"We've invested about $12 million of our own money and a couple of million from the Federal Government," said Polartechnics managing director Victor Skladnev.

The cervical expert system uses two DSP (digital signal processing) chips to detect changes in the state of the cervix, while the melanoma system uses a conventional Pentium processor. Both need to undergo extensive clinical trials with the US FDA before they can be used in hospitals, said Skladnev. "Because there aren't any other systems that these can be evaluated against, they need to undergo the full trial process," he said.

The devices should be released to market at around the $US5,000 mark, although Skladnev said it's difficult to forecast pricing before the approval process has been completed.

Johnson & Johnson have signed up to market the expert systems in all regions apart from Australia and South-East Asia, which Skladnev said "we're keeping for ourselves".

"These technologies have the potential to earn billions in export dollars," he added.

CSIRO researchers are also working on imaging and tactile feedback technology that will allow surgeons to rehearse an operation before an incision is made. It will also allow, in conjunction with expert systems, the promise of telemedicine to be realised.

Josh Gliddon

INTERNET INVESTMENT

ASX turns to Net for Enterprise Market

The Australian Stock Exchange has embraced Internet technology to create its new Enterprise Market service, which aims to help match investors and companies seeking early-stage funding (investment up to and including the manufacture and sale of the company's first products).

According to ASX managing director Richard Humphry, there are some 10,000 small or medium-sized enterprises (SMEs) actively seeking equity capital: "On average they're looking for about half a million dollars. That adds up to a $5 billion market, so there's certainly a lot of potential."

Not surprisingly, IT companies are among the first to seek investment through the ASX's new Enterprise Market service, and several presented their case at the Enterprise Forum conference which accompanied the launch of the service.

ZENtronix is seeking a single investor or a consortium to inject $2 million to commercialise its NG^2 database miniaturisation technology. Unlike conventional compression techniques, miniaturisation allows files to be searched, read and updated without expansion.

Access Systems, a developer of Internet gambling systems, wants to raise $2 million by the end of the year to fund an expansion of its marketing as European jurisdictions legalise Internet gaming. The company only supplies licensed operators in strongly regulated jurisdictions. Products include back-end systems based on Sun hardware and Oracle databases, and player software written in Java implementing games such as bingo, roulette, draw poker and conventional multiline poker machines.

Other IT companies present at the launch of the service included Merit-Q, a developer of Internet-based home education and entertainment software; Sigtec, which focuses on computer-controlled dispatch and automatic vehicle location systems; and Resource Industries Australia, a developer of satellite imagery and positioning systems.

Created for the ASX by Bailey Bailey & Bailey, Enterprise Market is built on Digital Alpha hardware, Microsoft IIS, Oracle and the Oracle Web Request Broker.

Stephen Withers

Netscape is seeing some early successes as it pursues its build-your-own browser strategy.

Building the perfect browser

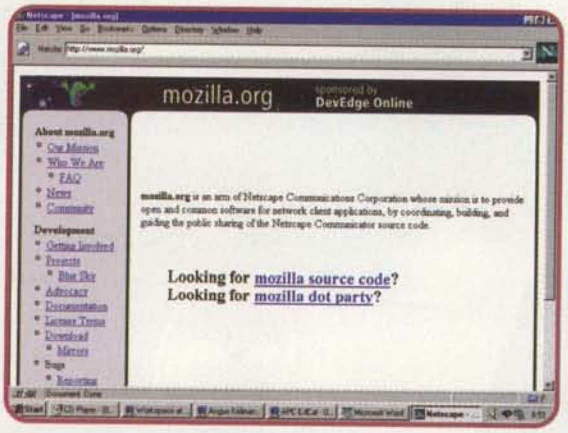
When Netscape made release 5.0 of its Communicator browser available in late March, for once the focus wasn't on what new features were enabled (in the initial version, there are glimpses of the planned Aurora desktop revamp). Instead, the interest lay in the fact that, rather than merely releasing a finished program, for the first time developers could get their hands on the source code made by Netscape.

Communicator 5.0 is the first major upgrade to be launched since January, when Netscape unveiled a new policy of making its client software free to all users and also making the source code freely available to developers.

Since Navigator was made freely available to all users in January, download rates for the browser have doubled, and market share is beginning to turn in Netscape's favour, said executive vice-president of products, Marc Andreessen. However, as it is no longer a source of revenue, this could be regarded as a moot point. Andreessen said that a large installed browser base is still crucial to its strategy, as it led users to its home page, which was being transformed into an online service centre.

Andreessen said that Netscape has already built up alternative revenue streams to replace the money it made through Navigator licences. This quarter the company expects $US100 million in revenue from its enterprise software business and another $US25 million from its Web site activities. There are already 3.6 million registered Netcenter users, he said.

Reflecting the importance of the Web site, former executive vice-president of sales and marketing Mike Homer has been made head of a new division responsible for its Netcenter service, which offers information and ecommerce products from the main Netscape home page. Netscape's popular Web site is widely regarded as its most successful business, and the shift has been interpreted by analysts as a means of further emphasising the site. Company president and CEO James Barksdale will fill Homer's shoes while a new replacement is sought.



mozilla.org is an arm of Netscape Communications Corporation whose mission is to provide open and common software for network client applications, by coordinating, building, and guiding the public sharing of the Netscape Communicator source code.

Looking for mozilla source code?
Looking for mozilla dot party?

In another management shift, the company's local managing director Julian Quinn has taken up a position at middleware vendor BEA Systems, where he will take on the role of managing director, South-East Asia.

Quinn's departure comes after less than a year in the position. His predecessor, Clive Mayhew-Begg, also only occupied the position for 12 months. Quinn will be replaced by Rob Stewart, who joined Netscape as southern region sales director in October last year. Stewart's background includes management roles at Tandem and Digital.

Developing world

While offering software free and developing its site are the most visible parts of Netscape's current strategy, perhaps the most important is the offering of free source code. Netscape continues to lead the worldwide market for browsers in most surveys, although it faces increasingly stiff competition from arch-rival Microsoft. The strategic shift is designed to help maintain Netscape's near-ubiquity in the face of Microsoft's plans to integrate its browser technologies into Windows.

Although it is facing resistance from US competition authorities, Microsoft hopes that by including its basic browser technologies in its market-leading operating systems, developers will automatically use them in preference to others. Netscape's response was to create mozilla.org, a semi-autonomous organisation which will control the release, distribution and collation of Communicator source code (see *APC* April, page 15). Netscape will continue to develop its own 'official' version of Communicator, but expects many new additions and features to come from the public domain, thereby helping it maintain a competitive edge.

One problem with making the source code public is that many features can't be included in the release. For instance, Netscape's licence with Sun bars it from including a Java Virtual Machine with the browser. Similarly, Netscape's 128-bit security and encryption features, which are barred from export outside the US, can't be included.

A group of Australian programmers known as the Mozilla Crypto Group hopes to overcome that problem by developing its own replacement for Netscape's inbuilt security systems. The group will use the SSLeay freeware security library as the basis of the project, and is being offered hosting space by Queensland's Distributed Systems Technology Centre. Within a week of the first release of the source, the group had already developed working Linux and Win32 prototypes which incorporated SSLeay.

Another important addition to Version 5.0 will be full support for XML (Extensible Markup Language) Version 1.0. Microsoft already offers some support for XML in Internet Explorer 4.0, although that product was released before the first version of the XML specification was approved by the World Wide Web Consortium (W3C) in February. Such cross-browser support may help calm irate Webmasters who have had to contend with increasing divergence between the two browsers, especially in the area of Dynamic HTML (DHTML) and JavaScript support.

Microsoft is unlikely to quickly release a product to compete with Communicator 5.0. Internet Explorer 5.0 is only in very early alpha testing, and the company is not renowned for its quick cycle times.

Angus Kidman and Selina Mitchell

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Participation in the world's biggest trade fair has paid off for many Australian companies.

CeBIT brings home the winners

CeBIT 98: The facts

Number of exhibitors:	7,250
Number of attendees:	670,000
Area:	365,000m^2
Frequency:	Annual
Biggest exhbitors:	Taiwan (502 stands) US (411 stands)
Australian presence:	57 stands

So who says we don't have a successful IT export industry? At CeBIT 98 in Hanover this year, Australian products proved popular with IT purchasers and multinational manufacturers. The seven-day trade fair has already netted participating Austrade-supported companies about $227 million worth of sales over the next two years.

This was an increase of between $27 and $28 million on last year's efforts, despite there being roughly half the number of participating companies, said Rod Moorehouse, Austrade's acting executive general manager for Europe.

The figure includes only business deals that have already been signed. There are many companies still conducting sales, distribution and OEM discussions, including one small-to-medium enterprise which was in the process of negotiating a $100 million OEM deal as *APC* went to press. The figure also includes only the companies representing Australia on the two Austrade InTelligent Australia stands. Some companies previously with Austrade, such as Keycorp, have become so successful through CeBIT that they now trade under their own banners.

CeBIT has had its overnight success stories, but most of the time it is a long, hard slog for Australian companies to wring the benefits from participating at the world's largest trade fair. It often involves returning for many years, learning more each time.

For local firm Concord, it has also meant making subtle changes to its product to give the impression that it is not Australian, but American, so that it can successfully be sold in both US and Australian markets.

Australian software doesn't sell in the US or in Australia, managing director of Concord, Colin Bell, was told by a joint-venture partner he found at CeBIT two years ago. "The US market will buy what is perceived to be US software. The US is seen as the centre of technical innovation." Anything that comes from the US is perceived to be good, he said.

This is not always the case, however. "While there is a lot of technology in the States, often the technology that works best comes from outside," said Bell. Functionality may be diluted because the application software needs to be sexy and glitzy, he said. Software coming out of Australia and Europe usually has more depth.

The European distributor Concord found at CeBIT 96 is being trained on the new versions and now Concord is looking for more European distributors. The company decided not to focus on Asia in the medium term, a decision that was made before the downturn in many Asian economies. "It takes a long time to build the right sorts of relationships, and there is a four-year gestation period, especially in the IT industry. In Asian cultures they like to build personal relationships before they will do business."

Bell is convinced his company's involvement at CeBIT has been positive, despite the costs. In 1996 Concord came to CeBIT with three new products; it wanted to see if they were competitive, if there were companies interested in distributing them, and if there was any technology that should be integrated. It found that two out of three were competitive, obtained distributors in Europe and the US, and found some software that is now integrated into the products.

Bell also noted his disappointment for the lack of government support for Australian-developed IT products, both during and after their development. He said the few schemes available were riddled with red tape, that venture capital was hard to gain because of the high capital gains tax, and that the Australian government did not usually buy Australian products.

"It's a wonder we don't all up and move to the US," he said.

While this year has been a major success, the coordinator of the Australian delegation to CeBIT 98 hopes to change its strategy next year to meet the needs of more Australian IT firms.

While Austrade offers comprehensive support for many established Australian companies wishing to enter the competitive export market, its program is not suitable for those companies just starting out in the IT business.

"We need to do something about an incubator," said Rod Moorehouse (who replaced Dr Paul Twomey when the latter started work as the CEO of the National Office for the Information Economy). "There's a whole batch of companies at the moment that we are not talking to."

The whole idea of CeBIT was overwhelming for some companies, but those which are almost ready to go public with a product and want to test the water do not really have an avenue to do this through Austrade, said Moorehouse. So how do you get these companies exposed to the market without pushing them in the deep end at the enormous CeBIT fair?

Moorehouse said Austrade hopes that next year it will be able to offer emerging businesses support and advice, as well as office space at CeBIT, without the need to have a stand and sell. It would be an inexpensive exercise for both Austrade and the businesses involved — a case of "have briefcase, will travel", said Moorehouse. Flights and accommodation, as is the case with all exhibitors, would be paid for by the company.

"The value would be in market knowledge and market placement," he said. "It addresses the future growth of the IT industry in Australia. You have to be exposed to grow."

While the vast majority of the businesses are successful at CeBIT, occasionally a company may fall through the net and discover its product is not up to scratch. It would be better to establish this before money is spent to exhibit at CeBIT, Moorehouse said.

Selina Mitchell

Gateway Solo 9100XL

At last, a Pentium II notebook. For months, notebook possibilities have been hamstrung by the fact that the best available processor was the 266MHz Pentium Tillamook, while desktop users luxuriated in next-generation power.

Intel has finally managed to compact the PII into a 240-pin mini-cartridge that consumes more power than a Tillamook, but less than the earlier Pentium MMX chips (and only half that of a desktop Pentium II). Gateway and Dell, as usual, are the first to market, and have released notebooks incorporating 233MHz and 266MHz chips. *APC* had a brief look at the Dell and was impressed, but only the Gateway was available to us long enough for testing.

With a 266MHz Pentium II processor, 64M of RAM, a DVD-ROM drive and a beautiful 14.1in active matrix screen, the Solo 9100XL is cutting-edge technology. Unfortunately, these and other inclusions mean that at 3.9kg it seems to weigh a ton.

Testing configuration

The benchtest results were obtained using the following test systems:

Gateway Solo 9100: Intel Pentium II 266MHz, 64M SDRAM, 512K cache, 6.4G IBM Ultra ATA hard disk, FAT file system and no hardware disk cache. The video subsystem consisted of a Trident Cyber 9397 PCI, 4M SGRAM, driver version t4.10.01.2136 running at 1,024 by 768 pixels with 256 colours. The operating system used was Microsoft Windows 95B.

IBM ThinkPad 770: Intel Pentium MMX 233MHz, 32M SDRAM, 512K cache, 5.1G IBM Ultra ATA hard disk, FAT file system and no hardware disk cache. The video subsystem consisted of a Trident Cyber 9397 PCI, 2M SGRAM, driver version t4.03.00.2114 running at 1,024 by 768 pixels with 256 colours. The operating system used was Microsoft Windows 95B.

The WinBench tests were performed without independent verification by Ziff-Davis, and Ziff-Davis makes no representations or warranties as to the results. All products used in the test were shipping versions available to the public.

But this is the Solo's only real failing — in most other areas it excels, as might be expected at the price. The processor oozes power and is well complemented by an 8G removable Ultra ATA hard drive. The 2x DVD drive performed flawlessly in all our tests with DVD movies, CD-ROMs and audio CDs, and the C-Cube DVD controller, producing excellent results. CD-ROM drives on other notebooks are faster for data CDs, but the Gateway's Toshiba SD-C2002 DVD drive also has a 3.5in floppy drive in its base, and both can be used simultaneously.

Built into the keyboard area are stereo speakers and a touchpad mouse, though the little Altec Lansing speakers sound quite tinny (the Yamaha OPL3-SAx sound components would reward connection to external speakers) and the touchpad sometimes found it hard to distinguish finger slides from taps. Adding to our frustration was a temperamental 'T' key on the otherwise pleasant keyboard, which tended to skip a beat occasionally.

The 9100XL came with Windows 95B installed, though in the past *APC*'s tests have shown that to get the best performance from a Pentium II system you really need Windows NT — which Gateway will add for an extra fee. However, NT 4.0 does not currently support USB ports (which are standard on the Solo, as are two Type II PC Card slots and a 56Kbps PC Card modem).

Even with Windows 95, our benchmark tests showed this is the fastest notebook *APC* has ever seen. Results like the CPUMark32 of 689, Business Disk WinMark of 1,050 and High-End Graphics WinMark of 132 place this notebook way ahead of the pack.

You will get much better battery life from a Tillamook-based notebook, though the Solo 9100XL's three hours and 12 minutes from its lithium ion battery is nothing to sneeze at. The machine gives off a lot of heat, though the internals seemed to cope and we didn't experience any performance problems during our tests.

The Solo 9100XL is excellent, but if you need a notebook now but Pentium II performance is simply a bonus, it's still worth looking closely at Tillamooks.

Simon Vandore

Benchtest results

	Gateway Solo 9100XL	IBM ThinkPad 770*
Business Winstone 98	20.2	16.06
BatteryMark 2.0	3:12	3:19
CPUMark32	689	467
Business Disk WinMark	1,050	994
High-End Disk WinMark	3,053.3	2,583.3
CD-ROM WinMark	997	1,093.3
Business Graphics WinMark	109	85.97
High-End Graphics WinMark	132	111.3

*For comparison

Gateway Solo 9100XL

■ **Distributor**	Gateway 2000
■ **Phone**	1800 500 337
■ **Online**	http://www.gw2k.com.au
■ **Price**	$8,499
■ **In short**	Pentium II power, DVD and fast components in an excellent notebook, but one that weighs serious kilos.

A package that is well integrated with Notes and ViaVoice, but unlikely to steal market share from Microsoft.

Lotus SmartSuite 98

The basic idea behind an office suite is that it is an integrated 'productivity environment' where everything looks the same and interoperates seamlessly. Assuming that a reasonable effort is made to ensure consistency in terms of menus and methods, an office suite is, therefore, always best suited to an environment where software from its developer features prominently.

It's this integration that makes SmartSuite compelling for those who have already made a commitment to Lotus Notes and Lotus Domino. You can take content developed in WordPro, 1-2-3, Approach or Freelance, for instance, workshop it with your colleagues courtesy of Notes and SmartSuite's lauded collaborative functionality, and then render that content into HTML using new suite member Odyssey. Create a demo using ScreenCam, have Odyssey push the data up to your intranet or Web site and you're in business.

APC tested what appeared to be a feature-complete beta of SmartSuite 98. Despite the high state of readiness, some bugs, such as the default template in WordPro having a mind of its own, still were to be taken care of. It was also impossible to specify Microsoft's My Documents folder as the default save location, nor was there persistence of location when open and save dialog boxes were invoked. We're sure these quibbles will be fixed by the time SmartSuite goes gold, but it's worth keeping an eye on them.

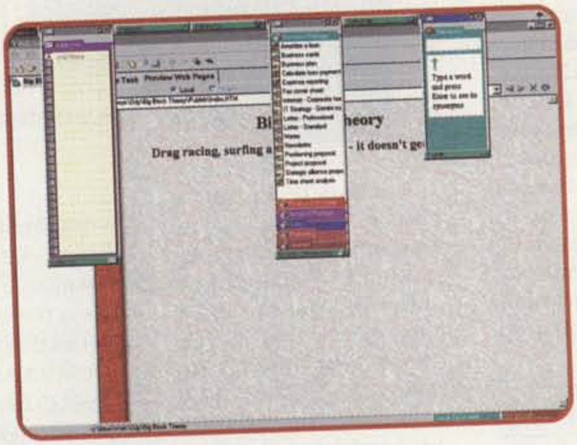
SmartSuite was tested in conjunction with Windows 98 Beta 2 and, with the glaring exception of the spell checker's handling of URLs, was extremely stable and displayed no tendency to crash.

Odyssey is the only overtly new feature in SmartSuite; indeed, regular SmartSuite users might be hard-pressed to spot any real difference between SmartSuite 98 and its predecessor. Web publishing functionality was also built into SmartSuite 97, and it appears that Odyssey is simply an enhanced, standalone version of these publishing tools.

Another new feature is the integration of IBM's ViaVoice into Lotus 1-2-3. ViaVoice, which was already integrated with WordPro, can now be used to edit documents in the venerable spreadsheet application.

The rejigged browser interface is a welcome change from the ugly, unfriendly version offered previously. The Lotus browser takes advantage of the HTML engines from either Netscape Navigator or IE, and while users can specify that Web content be rendered in their own browser, it's unclear whether there are any advantages, apart from familiarity, in doing so.

SmartCentre is SmartSuite's dashboard and cockpit, consisting of a bar that runs across the top of the screen that is populated by slide-out 'drawers' representing the suite's various applications and functions. It appears that the top of screen is the default location for SmartCentre because, no matter how hard we tried, it refused to be shifted to any other location.



One small quibble is the way that SmartSuite places an icon for each of its components in the system tray on the right-hand side of the taskbar. This is an unnecessary step considering that on installation SmartCentre is placed into Windows' start-up folder, and one that is further compounded by the configurable nature of the taskbar under IE4 or Windows 98 that allows application icons to be placed in their own section on the right-hand side.

SmartCentre is designed to be more than just another way of launching an application. It's to the credit of the designers that its default location, and the fact that it stays at the top of the screen regardless of which application is running, means that it's possible users will actually use it.

Making SmartCentre more than just a launch bar is the inclusion of drawers representing reminder, reference, address and calendar functions. There's also an Internet pull client drawer that allows the user to specify Web pages to be retrieved from certain locations at certain times. Of particular note is the reference drawer, a carry-over from SmartSuite 97 that lets the user type in a word to get its definition. An additional click accesses a list of synonyms for that word.

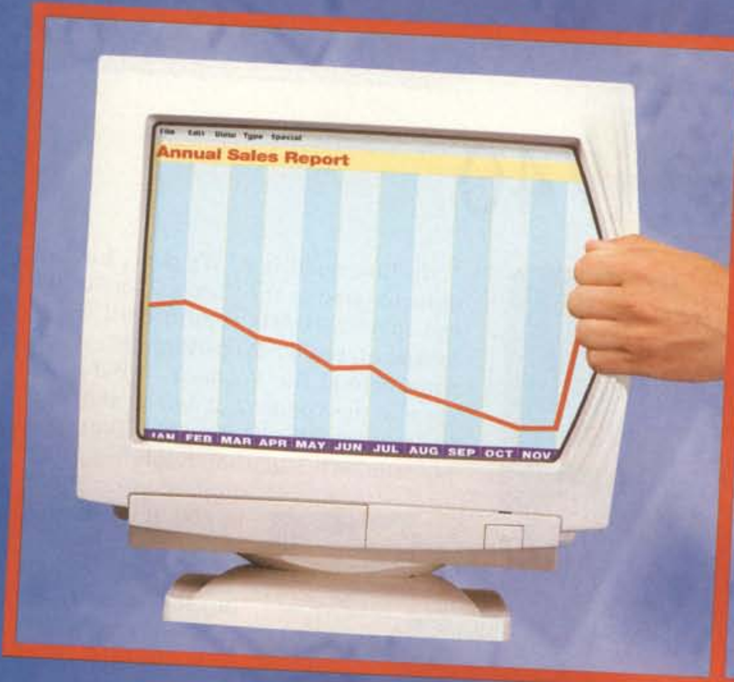
SmartCentre's final feature is the business productivity drawer that provides quick access to a myriad of templates, ranging from standard form letters through to a spreadsheet for amortising a loan through to a sales presentation. If you're in the habit of using templates often, this is a handy feature. You can also add your own drawer to SmartCentre, but it is restricted to a predetermined range of SmartSuite application functions.

While SmartSuite was designed to be integrated with other Lotus applications, particularly Notes, it's worth noting that there is little correspondence between the Notes 4.6 interface and that used in SmartSuite. Lotus has promised a total overhaul of the Notes interface, something along the lines of the drawers approach used in SmartCentre, but it remains to be seen how tight and deep that integration goes. If it's successful, Lotus will have created a compelling, and reasonably seamless work environment that should challenge Microsoft Office as the business productivity environment of choice.

Josh Gliddon

Lotus SmartSuite 98

Distributor	Lotus
Phone	(02) 9350 7700
Online	http://www.lotus.com
Price	Not yet available
In short	If you're not already a Lotus house, chances are this one will slip below the radar.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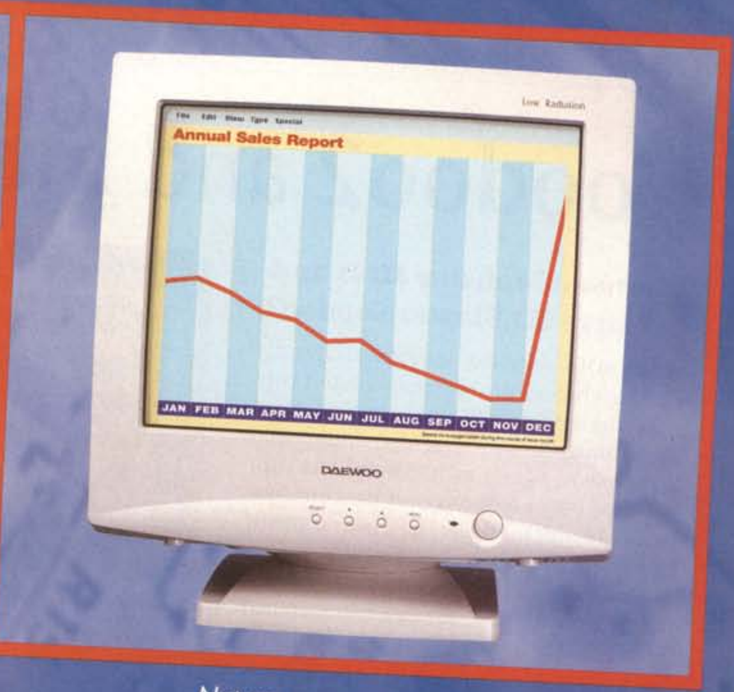
Your average monitor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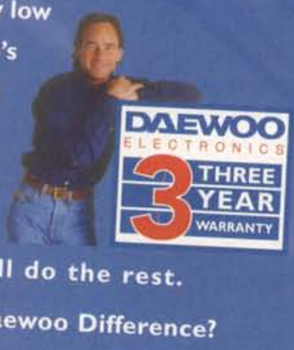

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Voodoo2 and Intel i740

Diamond Monster 3D II and Creative 3D Blaster Voodoo2

When 3DFX released its original 3D-only Voodoo chipset, the company all but captured the emerging 3D market. Since then other contenders such as NEC and nVidia have released their own 3D chipsets with equal or better features and performance in an attempt to corner their own share of this profitable market.

Enter 3DFX's newest chipset and successor to the Voodoo1 — the much anticipated Voodoo2. The new chipset is purportedly two to three times faster than its predecessor and comes with a host of new features and functionality, not least of which is a standard onboard RAM configuration of 8M. Like its predecessor, the product works in conjunction with a 2D card — it does not have its own 2D capabilities.

The first two boards to hit the market are from long-time multimedia players Diamond Multimedia and Creative Labs. The fact that both companies are trying to capture the market first is readily apparent in the boards themselves — except for the onboard RAM, both cards are identical. Still, some work has been put into the drivers for each card and, while they themselves are also in development, the new technology can be seen as an improvement over the original Voodoo chipset.

APC Labs tested the cards using WinBench 98 and Quake II's 'timedemo' test at both 640 by 480 and 800 by 600 resolutions. The table on page 33 shows both the 8M Diamond card and the 12M Creative card compared with the Diamond Monster 3D, a 4M Voodoo1 chipset-based card.

The results clearly show a performance increase of up to 250% over the original Voodoo chipset, and that's taking into consideration the development drivers for both Voodoo2 cards. However, it should be noted that 3D processing isn't always the domain of the card. Depending on the software, a specific portion of the frames per second can be attributed to the speed of a machine's CPU. When we carried out the same tests on a Pentium 200 system, the speed improvement was roughly 25% less than that of the Pentium II 233MHz system.

If a massive performance boost just isn't enough for speed freaks, it's possible to almost double the frame rate, or achieve faster frame rates at very high resolutions, by running two Voodoo2 cards in tandem. The technology is called SLI (Scan Line Interleave). The process is quite simply the method by which two cards are used to drive your display — one card rendering every even line and the other card rendering every odd line.

Despite both cards having SLI connectors, and despite both boards being identical in nature, they refused to cooperate in SLI mode together.

If you find your games running slower than you would like, or you want to enjoy the best affordable 3D technology on offer, purchasing one of these Voodoo2-based cards is the way to go. Although the Diamond Monster 3D II is currently an 8M card, Diamond has announced a new 12M version to match Creative's pitch. Given that the two cards are essentially identical, either will do well if you desire faster 3D.

Intel i740

The moment many graphics chip vendors have been dreading has finally arrived: Intel has released the i740. Industry analysts, such as *The Microprocessor Report*'s Peter Glaskowsky, have been predicting that Intel's i740 will dominate the graphics chip market within a relatively short time — not as a result of producing staggering products, but simply because it carries Intel's name.

The board we looked at was an Intel reference board (still in beta, so this should be considered when interpreting benchmark results). Intel is also marketing the i740 as a chip to be embedded on motherboards; we wouldn't be surprised, therefore, if in a few months' time several motherboard manufacturers announce boards with integrated i740 graphics.

So how good is it? It's good, but not quite as good as the Voodoo2 for 3D. It's the fastest 2D/3D combo card we've looked at, but for 3D performance it still rates behind the Voodoo2. It did come close to the Voodoo2 at 640 by 480 resolution (actually beating the Diamond Monster 3D 2 at that resolution), but dropped away at 800 by 600. It is certainly faster than the old Voodoo chip, beating the Monster 3D by a very considerable margin. It is Direct 3D capable, but at this early stage does not have OpenGL drivers, although these are planned to be available at a future date. In 2D, the 4M card we looked at is capable of 1,280 by 1,024 in 16-bit colour (the card also comes in a cheaper 2M version).

The i740 is an AGP-only solution, and utilises DME, enabling the use of very large textures. It also supports a very full set of 3D features, lacking some fogging features but covering pretty much everything else. The image quality in the games we played (including Jedi Knight, Tomb Raider 2 and Sub Culture) was excellent — easily better than the Voodoo and rivalling the Voodoo2.

Ashton Mills and Nathan Taylor

Testing configuration

An *APC* custom system with a single Intel Pentium II 233MHz processor, 64M RAM, 512K secondary cache, IBM 9G DCHS Ultra Wide SCSI hard disk, Adaptec 2940UW Ultra Wide SCSI disk controller, FAT file system and no hardware disk cache; Voodoo2 only: Cirrus Logic 5464, 546X.drv Version 4.10.01.1620, 3/4/1998, 1,024 by 768 pixels with 64,000 colours, a refresh rate of 60HZ with DirectX 5.0; Microsoft Windows 95 OSR2 using system cache with access to all available memory.

To obtain our 3D WinBench 98 scores in the 3D WinMark tests we used the following settings for all cards: Direct 3D HAL, MMX emulation, double buffer, 640 by 480 pixels, 16-bit colour, full screen, execute buffers.

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ALR-7200 ALR-8200 ALR-9000

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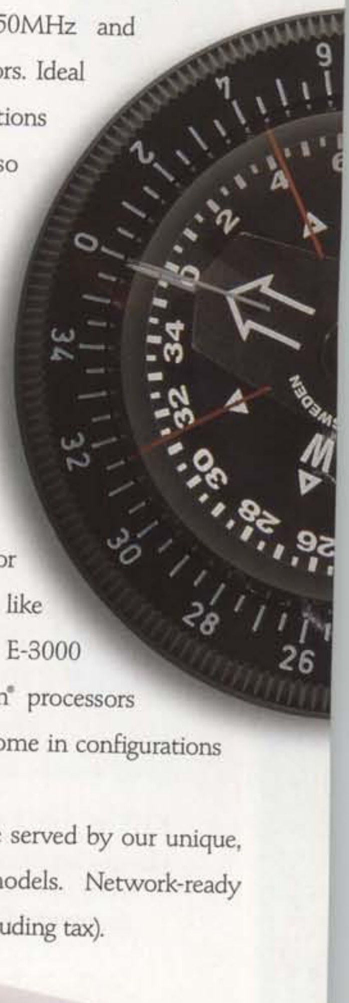

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Blowing up a Storm

Gateway G-Series & GP-Series go up Two Classes

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PC World, 1997 Readers' Awards
'Best Business PC' 'Best Home PC'

G6-233

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[1] Available on all systems that include Microsoft Windows 95.
Customer responsible for redeeming coupon and for fulfillment charges.

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Gateway Solo Series

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First across the line with Pentium® II processor

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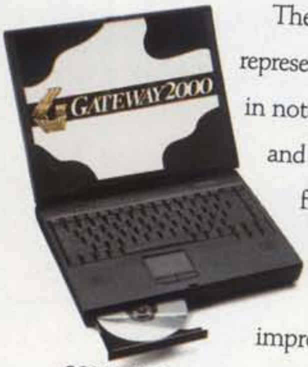

SOLO 9100

The Pentium® II processor represents a dramatic breakthrough in notebook functionality. Speed and performance both benefit from this new architecture, optimised for 32-bit applications. Expect improvements of up to thirty per cent over earlier Intel Pentium® processors with MMX™ technology at the same clock speeds, together with battery life that exceeds industry expectations.

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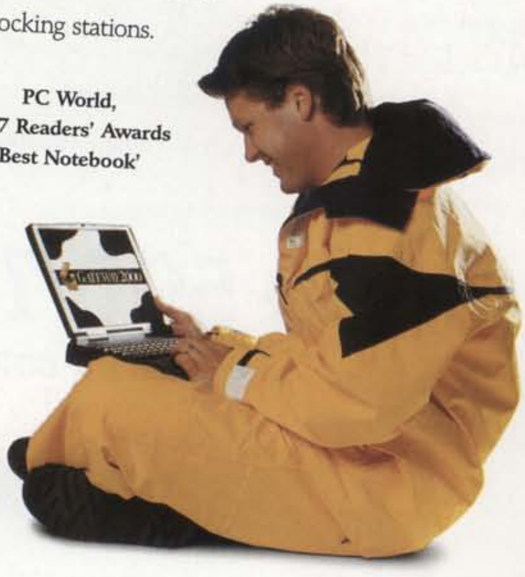

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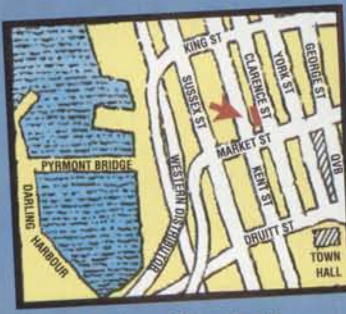
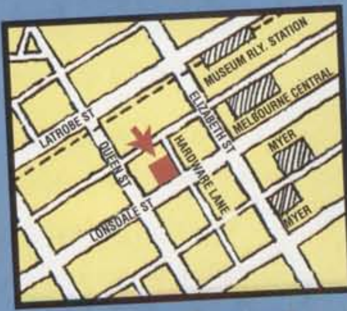
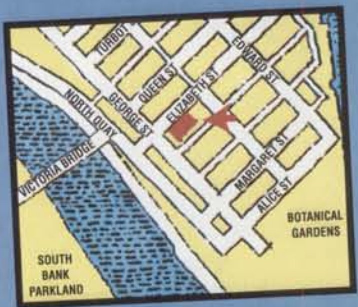


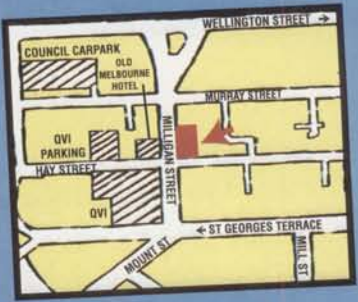
Sydney Showroom
225 Clarence Street, Sydney



Melbourne Showroom
398 Lonsdale Street, Melbourne



Brisbane Showroom
Shop 3, 47-79 Elizabeth Street, Brisbane



Perth Showroom
938 Hay Street, Perth

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All of Gateway's computers - desktops, notebooks and servers - are built to order. Just talk your needs through with our expert staff and we'll rig up a system just for you. Check out the specs on the back page and start to think about which fittings will suit you best.

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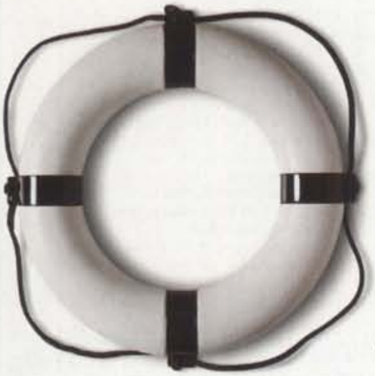

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GP5-233SE Intel 233MHz Pentium® Processor with MMX™ Technology, Microsoft Works
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- Min 13x/Max 32x CD-ROM Drive
- Midtower Case
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- 4MB nVidia AGP Graphics
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- Midtower Case
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- Microsoft Intellimouse
- McAfee Virus Scan
- Microsoft Windows 95
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- Performance Amplified Speakers
- Desktop Case
- 104-Key Windows 95 Keyboard
- Microsoft Intellimouse
- x2 Technology 56 K/bits Data/Fax/Voice Modem and Speakerphone
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- 512K L2 Integrated Cache
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- 1.44MB 3.5" Diskette Drive
- 4MB nVidia AGP Graphics
- 15" Colour Monitor
- Min 13x/Max 32x CD-ROM Drive
- Ensoniq PCI Audio
- Performance Amplified Speakers
- Midtower Case
- 104-Key Windows 95 Keyboard
- Microsoft Intellimouse
- x2 Technology 56 K/bits Data/Fax/Voice Modem and Speakerphone
- Telstra Big Pond Internet Kit with 50 hours free access*
- McAfee Virus Scan
- Microsoft Windows 95
- **Microsoft Office 97, Small Business Edition+**

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G6-333

- **Intel 333MHz Pentium® II Processor**
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- 512K L2 Integrated Cache
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- 1.44MB 3.5" Diskette Drive
- 4MB nVidia AGP Graphics
- **17" Colour Monitor**
- Min 13x/Max 32x CD-ROM Drive
- Ensoniq PCI Audio
- Performance Amplified Speakers
- Midtower Case
- 104-Key Windows 95 Keyboard
- Microsoft Intellimouse
- x2 Technology 56 K/bits Data/Fax/Voice Modem and Speakerphone
- Telstra Big Pond Internet Kit with 50 hours free access*
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- **DVD-ROM Drive**
- Ensoniq PCI Audio
- **Boston Acoustic Media Theatre Speakers**
- Midtower Case
- 104-Key Windows 95 Keyboard
- Microsoft Intellimouse
- **Zip Drive and 100MB Zip Disk**
- **x2 Technology 56 K/bits Data/Fax/Voice Modem and Speakerphone**
- Telstra Big Pond Internet Kit with 50 hours free access*
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- Microsoft Windows 95
- **Microsoft Office 97, Small Business Edition+**

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G6-350 Intel 350MHz Pentium® II Processor, 6.4GB HardDrive, EV700 Monitor, without Zip Drive
$4599 inc. tax or $40 p/w†

Gateway Solo Portable PCs

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- 2GB Removable Hard Drive
- Modular 1.44MB 3.5" Diskette Drive
- Integrated Yamaha 16-Bit Sound with Stereo Speakers
- PCMCIA Slots - 2 Type II or 1 Type III
- NiMH Battery Pack & AC Pack
- 85-Key MS Windows 95 Keypad
- EZ Pad Pointing Device
- Built-in Mic & Line-In Jacks
- Parallel, Serial, fast Infrared, PS/2,ext. Video & USB ports
- Card Bus
- Casual Carry Case
- Microsoft Windows 95

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5100LS

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- 3GB Removable Hard Drive
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- Integrated Yamaha 16-Bit Sound with Stereo Speakers
- PCMCIA Slots - 2 Type II or 1 Type III
- 12 Cell Lithium-Ion Battery Pack & AC Pack
- 88-Key MS Windows 95 Keypad
- EZ Pad Pointing Device
- Built-in Mic & Line-In Jacks
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- McAfee Virus Scan
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9100XL

- **Intel 266MHz Pentium® II Processor**
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- 512K SRAM Write-Back Cache
- 64bit 4MB SGRAM High Performance 2D/3D Video Accelerator
- **8GB Removable Hard Drive**
- **Modular Combo 2X DVD Drive and 1.44MB 3.5" Diskette Drive**
- Integrated Yamaha 16-Bit Sound with Stereo Speakers
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- 12 Cell Lithium-Ion Battery Pack & AC Pack
- 88-Key MS Windows 95 Keypad
- EZ Pad Pointing Device
- Built-in Mic & Line-In Jacks
- Parallel, Serial, fast Infrared, PS/2,ext. Video and USB, PAL in/out, 15 pin game and Midi ports.
- **Executive Carry Case**
- McAfee Virus Scan
- Microsoft Windows 95
- **Microsoft Office 97, Small Business Edition+**

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Solo 9100LS - Intel 233MHz Pentium® II processor, Combo 8/20 CD-ROM & 1.44MB Diskette Drive, 5GB Hard Drive, Casual Carrying Case.
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Results and specifications

	Creative 3D Blaster Voodoo2, 12M	Diamond Monster 3D II, 8M	Intel i740, 4M	Diamond Monster 3D, 4M*
Distributor	Creative Pacific	Diamond Multimedia	Intel	Diamond Multimedia
Phone	(02) 9906 8887	(02) 9460 2355	(02) 9937 5800	(02) 9460 2355
Online	http://cppl.com.au	http://www.diamondmm.com	http://www.intel.com	http://www.diamondmm.co
Price	12M $699, 8M $499	8M $549, 12M $749	2M $249, 4M $299	4M $339
BENCHMARK RESULTS				
3D WinBench 98				
640 by 480 by 16-bit colour				
3D Processing	10.7	9.72	10.4	9.5
3D WinMark	502	443	458	291
800 by 600 by 16-bit colour				
3D Processing	10.6	10.7	10.4	Not capable
3D WinMark	487	483	393	Not capable
Quake II Timedemo				
640 by 480 (fps)	49.4	50.4	No OpenGL driver yet	21.2
800 by 600 (fps)	42.6	44.3	No OpenGL driver yet	Not capable
Flat shading	Capable	Capable	Capable	Capable
Gouraud shading	Capable	Capable	Capable	Capable
Dithering	Capable	Capable	Capable	Capable
Z-buffer	Capable	Capable	Capable	Capable
Perspective correction	Capable	Capable	Capable	Capable
Nearest	Capable	Capable	Capable	Capable
Linear	Capable	Capable	Capable	Capable
Nearest mipmap nearest	Capable	Capable	Capable	Capable
Nearest mipmap linear	Capable	Capable	Capable	Capable
Linear mipmap nearest	Capable	Capable	Capable	Not capable
Linear mipmap linear	Capable	Capable	Capable	Not capable
Modulate texture blending	Capable	Capable	Capable	Capable
Decal texture blending	Capable	Capable	Capable	Capable
Decal alpha texture blending	Capable	Capable	Capable	Capable
Modulate alpha texture blending	Capable	Capable	Capable	Capable
Flat wrap texture addressing	Capable	Capable	Capable	Capable
Cylindrical wrap u	Capable	Capable	Capable	Capable
Cylindrical wrap v	Capable	Capable	Capable	Capable
Clamp texture addressing	Capable	Capable	Capable	Capable
Mirror texture addressing	Not capable	Not capable	Capable	Not capable
Cull counterclockwise	Capable	Capable	Capable	Capable
Cull clockwise	Capable	Capable	Capable	Capable
Cull none	Capable	Capable	Capable	Capable
Fog vertex linear	Capable	Capable	Capable	Capable
Fog table linear	Capable	Capable	Not capable	Capable
Fog table exponential	Capable	Capable	Not capable	Capable
Specular highlights	Capable	Capable	Capable	Capable
Color key transparency	Capable	Capable	Capable	Capable
Alpha transparency	Capable	Capable	Capable	Capable
Source alpha pixel blending	Capable	Capable	Capable	Capable
Add pixel blending	Capable	Capable	Capable	Capable
Modulate pixel blending	Capable	Capable	Capable	Capable
Alpha vertices	Capable	Capable	Capable	Capable
Fog vertex and color key	Capable	Capable	Capable	Capable
Fog vertex and alpha	Capable	Capable	Capable	Incorrect
Anti-aliasing	Not capable	Not capable	Not capable	Not capable
Texture swapping	Capable	Capable	Capable	Capable
Narrow z accuracy	Capable	Capable	Capable	Incorrect
Wide z accuracy	Incorrect	Incorrect	Capable	Incorrect
High triangle count	Capable	Capable	Capable	Capable
Texture fidelity	Capable	Capable	Capable	Capable

*For comparison

All products used in this test were shipping versions available to the public.

These tests were performed without independent verification by Ziff-Davis, and Ziff-Davis makes no representations or warranties as to the results.

Are machines that incorporate Intel's new 350MHz and 400MHz processors worth the price?

Gateway 2000 G6-400 XL

Benchtest results

	350MHz	400MHz
CD-ROM WinMark 98: Overall*	1,326.67	1,326.67
CPUMark32	864	1,020
FPU WinMark	1,780	2,040
Business Disk WinMark 98*	1,373.33	1,383.3
High-End Disk WinMark 98*	3,990	4,053.33
Business Graphics WinMark 98	172.33	197.67
High-End Graphics WinMark 98	234.67	270
Business Winstone 98	24.53	26.27

* Thousand bytes/sec

Intel has once again upped the ante by releasing two new, faster processors which carry the usual price premium for the company's top-of-the-range offerings. As usual, Gateway's build-to-order model has enabled it to be one of the first vendors to produce a machine using the new processors. By the time you read this, most vendors will probably be offering machines based on new 350 and 400MHz Pentium IIs and Intel's new chipset, which was released in conjunction with the processors.

Both the 350 and 400MHz processors are based on Deschutes technology, and are manufactured using a 0.25-micron process. Despite the heat advantages of Deschutes processors, both come equipped with huge heat sinks, which may make the production of ATX multiprocessor systems a challenge for some vendors.

Gateway 2000 sent us a 400MHz machine (the G6-400 XL), but also threw in a 350MHz processor so we could compare the two chips. We tested the system with both.

For some, buying a 350MHz processor might seem nonsensical — a 333MHz processor is a few hundred dollars less, and the performance difference is minimal. One benefit the 350 has over the 333MHz, however, is its use of the 100MHz system bus.

The key enabler for the 350 and 400MHz Pentium II processors is the 440BX chipset, which was released in conjunction with the processors in April. The BX motherboard officially supports a 100MHz front-side bus. In addition to enabling the high clock speeds of the 350 and 400MHz processors, the higher system bus speed enables faster access to main memory, although the speed at which the processor accesses the level 2 cache is still half the speed of the processor (175 and 200MHz respectively). The BX chipset is also capable of handling chips based around 66MHz bus speeds (anything up to the 333MHz processor). If you currently have an LX motherboard, however, you will not be able to use the two new processors because the LX is only capable of 66MHz, not the 100MHz these two new processors require to run at full speed.

Testing configuration

Both of the processors reviewed by *APC* in this article were tested on a single system comprising:

Gateway 2000 system, a single Intel Pentium II 350MHz or 400MHz processor, 64M RAM, 512K secondary cache, IBM 8.4G Ultra ATA hard disk, STB Velocity 128 and DVD add-on card, FAT file system and no hardware disk cache; 1,024 by 768 resolution, driver version 4.10.01.156, Windows 95 OSR2 using system cache with access to all available memory.

These tests were performed without independent verification by Ziff-Davis, and Ziff-Davis makes no representations or warranties as to the results.

All products used in this test were shipping versions available to the general public.

Despite the bus speed advantage, compared to the 333MHz Gateway system we looked at a few months ago, the performance increase offered by the 350MHz processor is marginal. On the other hand, the 400MHz did offer a significant step up. The 333MHz system scored 840.67 in the CPUMark32 benchmark when we tested it. The 350MHz machine's score, 864, was only 2.8% higher. The 400MHz processor result was more of an improvement: 1,020, a 21.3% increase in performance over the 333MHz system.

When we tested the Gateway system with Business Winstone, the difference between the 350MHz Pentium II and the 400MHz Pentium was minimal: 24.53 versus 26.27, an improvement of only 7.1% (Business Winstone measures overall system performance).

As one might expect, Intel is the first to market with a BX motherboard, and it is exactly this board which is used in the Gateway. Like Intel's LX motherboard, it has one AGP (2x) slot, four PCI slots and two ISA slots. While this is slightly less than usual, the small number of ISA slots is partially made up for by the integration of Ensoniq PCI audio into the motherboard. The AGP slot on the motherboard is already taken by the STB Velocity 128 graphic card, and one of the PCI slots is occupied by an STB MPEG-2 decompressor. One of the ISA slots is also taken by an internal 56Kbps x2 modem. The presence of only three DIMM slots is a little disappointing, limiting the memory capacity of the system to 384M (we tested it with 64M).

Other goodies thrown in with the Gateway G6-400 XL system include an 8.4G IBM Ultra ATA hard disk, a floppy disk drive, a 2x DVD drive and a Zip drive (supported in the BIOS and available at bootup). The monitor delivered with the 400MHz machine was a 19in CrystalScan. The whole configuration we received will set you back $5,599 — only an option for power users at this stage.

Nathan Taylor

Gateway 2000 G6-400 XL

Distributor	Gateway 2000
Phone	1800 500 742
Online	http://www.gw2k.com.au
Price	400MHz system $5,599
In short	A relatively expensive upgrade for a not-so-great performance increase. One for power users only.

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Also available with 333MHz and 350MHz versions*PC World (U.S) June 1997 gave Dell a 5-Star rating in Service and Reliability. *Delivery is in addition to the advertised prices shown. Certain configurations cannot be changed. Dimension warranty is three years. First year on-site service. On-site service is available in most metropolitan areas, however a delay may be experienced in remote areas. Years 2 and 3 provide for parts warranty only and does not include the monitor. An upgrade option to 3 years on-site service is available. 1 year limited warranty and return-to-base service for Inspiron only. Microsoft, Windows 95 and Windows NT are registered trademarks and IntelliMouse is a trademark of Microsoft Corporation. Dell offers free, lifetime telephone and web technical support on Dell computer hardware and the installed operating system. The Intel Inside logo and Pentium are registered trademarks and MMX is a trademark of Intel Corporation. 'You'll need a valid credit card to access. 50 free hours must be used within the first month of registration. Normal Telstra charges apply.

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MMX intel inside pentium® II

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- 1.44MB floppy disk drive
- 24X CDROM
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- 6 expansion slots
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- Dell Mouse
- HP Open View

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- 512KB integrated L2 cache
- 9GB ultra wide SCSI hard drive (10K rpm)
- 1.44MB floppy disk drive
- 24X CDROM
- 8 expansion slots
- 10 drive bays (4 external, 6 hot swappable)
- Intel Pro 10\100 PCI Ethernet NIC
- HP Open View
- Dell Mouse

$9,499* inc tax

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"ABSOLUTELY BREATHTAKING" PHOTOGRAPHIC PRINTING.

The other system is second generation PhotoRealism. As Hard Copy Observer says, "...(it) is absolutely breathtaking...".[1]

The first "7-colour process". The secret is the PhotoRealism colour ink cartridge, included as standard. It uses a seven-ink process, conventional CMY, new lower density CMY inks, plus black. Also, thanks to P-POP it is the first low-density ink system that can be used on plain paper.

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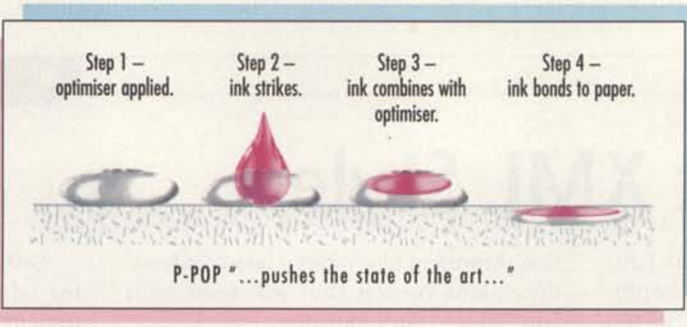
1. U.S. Hard Copy Observer, August 1997. 2. Optional BC-61 CMY ink cartridge. 3. Speed is an estimate and, for comparability, is based on a competitive manufacturer's colour retail price, including tax. Canon Australia Pty Ltd ACN 005 002 951. Canon and the Canon logo are registered trademarks and PhotoRealism and P-POP are trademarks

BJC-7000 – $729 RRP


Step 1 – optimiser applied.
Step 2 – ink strikes.
Step 3 – ink combines with optimiser.
Step 4 – ink bonds to paper.

P-POP "...pushes the state of the art..."

A new gold standard.

PhotoRealism is not a self-styled "photo-quality mode", but a unique Canon invention that is fast becoming the gold standard of the industry, delivering near silver halide photographic quality.

9000% more colour! The inks can be combined and layered, producing up to nine saturation levels per colour, per pixel. This results in up to 90 times the colour combinations of traditional CMYK inks, and considerably better "process blacks and darks".

Almost invisible pixels. This, combined with the Canon Colour Image Processing System (CCIPS), completely changes the way both dark and light half-tones are reproduced. Colours have far finer gradations without banding and lines. And even on hard-to-produce light shades such as skin tones and off-whites "...individual pixels in the image are barely visible".[1]

"(CARTRIDGE) CAPABILITIES NEVER BEFORE SEEN..."[1]

Then, the cartridges "...are the largest we have seen ...(offering) new capabilities never before seen in a desktop inkjet printer ...(with more ink nozzles) than any other cartridge in the industry".[1]

50% smaller nozzles. The nozzles are approximately half the diameter of previous models, so the ink drops are far finer. They are then fired at speeds close to 10,000 drops per second, using up to 1088 ink nozzles.

Blacks 80% faster. There are 304 nozzles for black alone. This generates speeds up to 720 characters per second with bi-directional printing, and up to four text lines per head pass. Putting this in perspective, this is 80% more than the rated CPS speed of the Epson 800!

480 colour nozzles. There are 480 nozzles dedicated to colour in the PhotoRealism cartridge. (This is 150% more nozzles than the Epson 800.)

The BJC-7000 achieves colour speeds as high as 4 ppm.[2] And, thanks to PhotoRealism, true photographic quality can often be delivered at speeds far faster than printers using only conventional inks at high dpi.

Lower costs, better paper handling. Better plain paper use can obviously lower operating costs. There is also new, full-bleed A4 printing and the ability to print full card stock at paper weights up to 550 g/m2 (0.8mm).

Canon Customer Care. Finally, the BJC-7000 features a one-year warranty, upgradeable to three years for minimal cost, and is backed by our Customer Care hot-line support. Drivers are available for DOS and Windows 3.1x/95.

If you would like to learn more, call us on 1 800 021 167.

Second generation PhotoRealism produces 9000% more colour combinations for "absolutely breathtaking" results.

text test. Actual speed will vary based on system and other factors. Canon estimates maximum colour graphic performance at 3.5ppm. Price as shown is recommended of Canon Inc. All other trademarks are the property of their respective owners. CS/4372

Canon

ArborText XML Styler

Since Extensible Markup Language (XML) was given the official stamp of approval by the World Wide Web Consortium (W3C) in February this year, software companies have been falling over themselves to exploit the technology in development tools. One of the first to hit the market was ArborText's XML Styler.

The product, which ArborText is offering free to end users, is designed to allow the easy development of style sheets which conform to the Extensible Stylesheet Language (XSL) specification co-developed by Arbortext, Inso and Microsoft. XSL, which is a style description language designed for use with XML documents, has been submitted to the W3C for ratification but is not yet an endorsed standard, and diverges in some instances from the cascading style sheet specification (CSS) developed by the W3C.

APC tested Version 2.03 of the 32-bit Windows release of XML Styler, which is designed to be used in conjunction with Internet Explorer 4.0 and requires Microsoft's XSL ActiveX control to function. Arbortext also offers a less Windows-dependent version that will work with Sun's Java virtual machine.

Overall, we found that XML Styler offered a quick and easy way to develop XSL style sheets, much simpler than attempting to construct them by handwriting code. The program uses a straightforward tabbed interface, with XSL construction and style rules displayed in a conventional cascading tree format. The HTML-based help, although not entirely complete, still offers all the information you're likely to need.

When creating a new style, you have the option of importing tag names from either a pre-existing XML document or from a simple text file containing a list of names. The style sheet can automatically be associated with an XML document for previewing in a browser, and this can be set for live updates while editing. Setting up basic styles requires minimal knowledge, but to really exploit the power of XSL you will need some understanding of the specification and its relationship to XML documents.

One problem is that dialog windows for editing rules or styles sometimes appear underneath the main window rather than on top of it, and the screen can quickly become crowded when working on complex style sheets with automatic previews.

While Web site developers may wish to wait until XSL has travelled further in the standards process before heavily committing themselves to it, XML Styler offers a straightforward path for those who wish to experiment with the possibilities it has to offer.

Angus Kidman

ArborText XML Styler

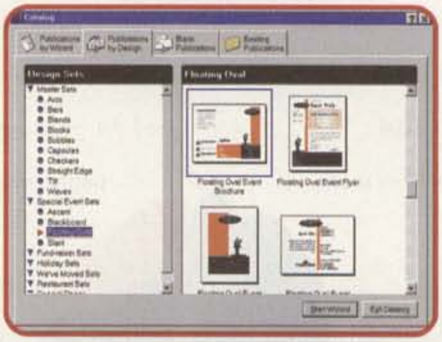
■ **Distributor**	Arbortext
■ **Online**	http://www.arbortext.com/xmlstyler
■ **Price**	Free
■ **In short**	A useful tool for developing XSL style sheets quickly.

Microsoft Publisher 98

Microsoft Publisher is part of Microsoft's Office suite and is intended for the office worker who needs to produce the occasional publication — such as a leaflet or business card — with the minimum of fuss.

To make this kind of task easy, Publisher 98 has a look and feel that's very similar to other Office programs, right down to the Office Assistant, that supremely helpful (or irritating, depending on your point of view) animated helper who offers tips and help. As well as the common interface, Publisher shares numerous features with the other Office programs. For example, it will perform on-the-fly spelling and grammar checks just like Word, and does so using the same dictionaries as the other programs.

As well as the familiar appearance and organisation, Publisher also simplifies things by using a wizard-based approach to design. The catalogue of available designs has been extended considerably in this version, and the organisation of this rather overwhelming array of templates has been enhanced by having them grouped both by category and by design. This means that you can either browse through samples of, say, newsletters or business cards, or you can look through a set of publications which share a common design theme. However, the best thing about these wizard-driven templates is that you can change your mind as you work without losing information. So if, for example, you get halfway through a publication and then want to change the entire look, or just the colour scheme, you can do so without having to start again from scratch.



Yet, despite this straightforward approach, Publisher is quite powerful. You can choose to create publications from scratch, defining your own layout and styles as you go, and then scan images directly into Publisher or create custom graphics using the supplied drawing and WordArt tools.

Another useful new feature in Publisher 98 is that it provides simple options for converting your paper-based publications into Web pages (or vice versa), and there are numerous templates designed specifically for the Web.

Naturally, there are over 12,000 new clip-art items included with this version, plus over 1,500 photos and a selection of about 300 animated GIF files, specially designed for Web pages.

Jim Endersby

Microsoft Publisher 98

■ **Distributor**	Microsoft
■ **Phone**	(02) 9870 2200
■ **Online**	http://www.microsoft.com.au
■ **Price**	$149
■ **In short**	An ideal tool for a part-time publisher, especially one who already uses other Microsoft Office programs.

New Super Economy mode lowers costs in colour and B&W to print

page after page after...

For just $199 RRP, the new BJC®-210SP delivers both Photo Mode quality colour, and black & white at a speed comparable to a personal laser. It also helps lower operating costs in two ways.

Use 75% less ink. A new Super Economy mode has been developed.

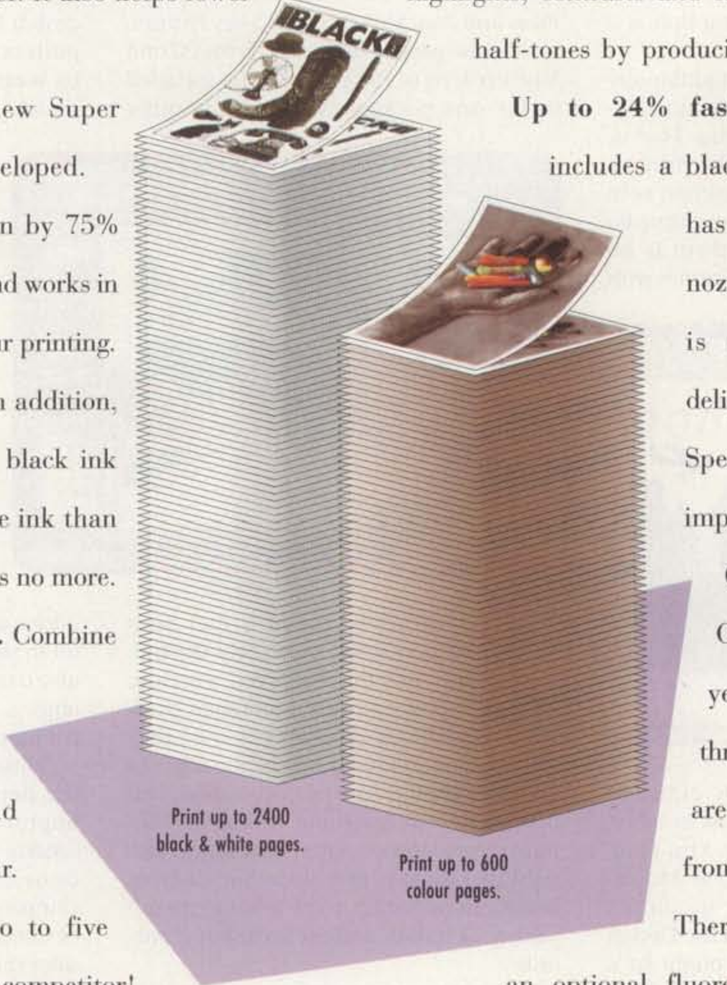
It reduces ink consumption by 75% compared to Standard mode, and works in both black and white and colour printing.

Bigger black cartridge. In addition, there's the new high capacity black ink cartridge that holds 20% more ink than our previous cartridge, yet costs no more.

Up to 5 times the output. Combine these two features and the new BJC-210SP can print up to 2400 pages in black and white, and up to 600 in colour.

That's anywhere from two to five times the output of any direct competitor!

Photo Mode quality printing. Using the colour cartridge, included as standard, the BJC-210SP offers a choice of three high quality print modes – Normal, Fine and Photo.


BLACK
Print up to 2400 black & white pages.
Print up to 600 colour pages.

Advanced half-tones. Photo Mode uses the Canon Colour Image Processing System (CCIPS) to emphasise highlights, contrasts and shadows and visibly improve half-tones by producing a richer process black.

Up to 24% faster. The BJC-210SP also includes a black cartridge as standard. It has up to twice as many print nozzles as direct competitors, is up to 24% faster[1] and delivers resolution up to 720 dpi. Speed and quality are equally impressive in colour.

Canon Customer Care. All Canon printers feature a one-year warranty, upgradeable to three years for minimal cost, and are backed by hot-line support from our Customer Care staff. There is also an optional fluorescent ink cartridge for high impact.

For more information on cutting printing costs call 1800 021 167.

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[1] B&W speeds based on manufacturer's actual characters per second ratings. Price as shown is the recommended retail price, including tax. Canon Australia Pty Ltd ACN 005 002 951. Canon, the Canon logo and BJC are registered trademarks of Canon Inc. All other trademarks are the property of their respective owners. CS/4895

Now only $199 RRP

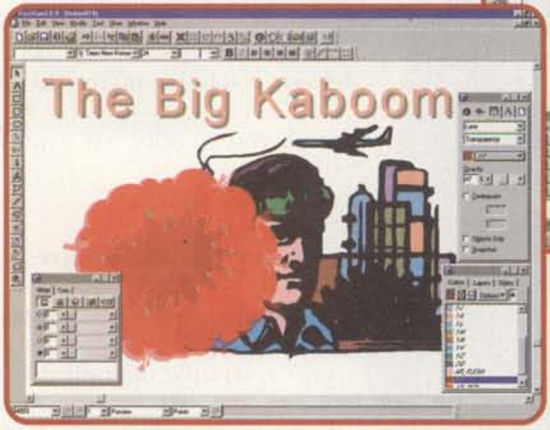
Canon

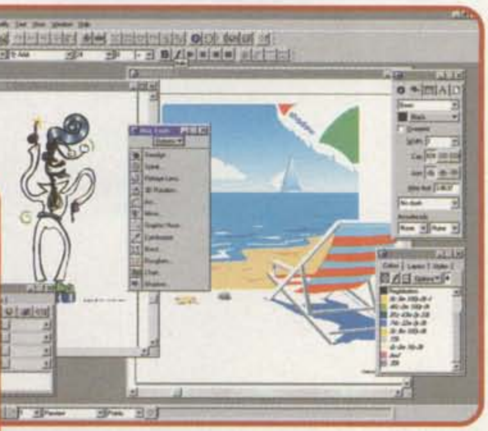
A step up from previous versions, and a serious competitor to CorelDRAW and Adobe Illustrator.

Macromedia FreeHand 8

Macromedia likes to cover all bases with its range of products and provide a tool for all seasons for the multimedia developer. FreeHand is its illustration program, and its eighth incarnation is a very mature product indeed.

Illustration programs are traditionally the domain of graphic designers and layout artists working in publishing. That is, their artwork is intended to be printed, and therefore has more in common with desktop publishing than with multimedia and Web design. However, there is no stopping progress: FreeHand 8 comes with many new features specifically aimed at using it for Web design — most notably, integration with Flash 2 via an Xtra plug-in called INSTA.HTML. (Flash is Macromedia's Web tool for vector graphics.) Together these parts are called the Design in Motion Suite and can be bought as a package for an extra $200 more than buying FreeHand on its own.





With INSTA.HTML you can create an image in FreeHand and export it to either a GIF or Flash format file ready for the Web; and FreeHand image layers can become the frames of a Flash animation, complete with URL links on objects to add interaction. It also supports the latest Dynamic HTML and cascading style sheet specifications, which provide absolute positioning of objects on a Web page, so you can be sure that what you create is what will be displayed (provided people are using a Version 4 browser).

The traditional features are still there, with support for PostScript and colour separation for print output, and a wide variety of vector and raster file formats can be imported, including Illustrator, CorelDRAW and Adobe Acrobat. Integration with programs like Photoshop, QuarkXPress and PageMaker is also a key feature.

It is also good to see that both the PC and Mac versions of the program are included in the one package, unlike some other Macromedia products that must be purchased separately depending on the required version. A problem with many such cross-platform programs is that they tend to favour one or the other in interface design and functionality. This new version of FreeHand is less Mac-like than its predecessor, with better support for right-click menus and dockable toolbars, better customisation of the interface to suit your work habits, and the inclusion of wizards.

A notable new feature is Dynamic Transparency, which means you can now create translucent graphics or semi-transparent vector objects, and have full control over opacity, colour, and so on. This kind of feature is found in most decent paint programs' tools, but is quite new to a vector-based illustration program, and it means you can better integrate vector and raster bitmapped images within FreeHand now, while retaining full editing capabilities.

In fact, many of the new features seem to have been borrowed from paint programs, including emboss, brightness, shadow and mirror, and a graphic hose which allows you to 'paint' with another image. It is now also much easier to rasterise a drawing — that is, convert it to a bitmapped image within FreeHand.

Another welcome new feature is freeform editing, which enables you to grab a line or Bézier curve anywhere and push or pull it into shape without having to worry about adding or reshaping nodes. Once you get used to how the mouse cursor changes and the control this gives you, you will wonder how you worked any other way.

Other less significant but still notable improvements are features such as the Change Case command and better text control (including kerning, underline and vertical text); more previews so you can see in advance what a certain effect will do before committing to it; an Export Again option for faster exporting while working back and forth between applications; and the ability to collect all the elements of an image for output, making it easier to pass on to print shops and typesetters. There is also a new Divide Path tool to better shape objects, and much better keyboard shortcut handling.

Throw in some enhancements under the hood to optimise performance and improve productivity, and you have a serious upgrade. Existing users will welcome these changes, while people using competing products like Adobe Illustrator or CorelDRAW may need to seriously consider shifting camps.

Philip Moore

Macromedia FreeHand 8

Distributor	Mitsui Computer (standalone version), Firmware Design (Design in Motion Suite)
Phone	1800 025 376 or (02) 4721 7211
Online	http://www.macromedia.com
Price	FreeHand 8 standalone $699; Design in Motion Suite $889
In short	One of the best illustration programs on the market just got a whole lot better.

Brilliant colour, PhotoRealism and an extra large print head for

faster blacks.

When it comes to versatility, the BJC®-4200 is ahead of its class.

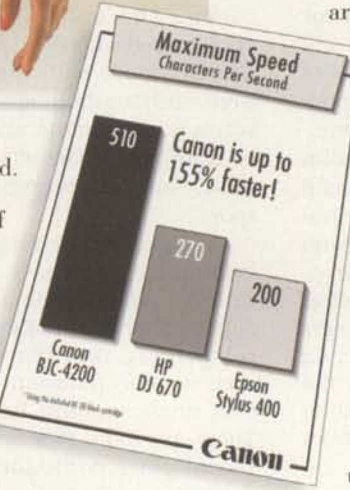
Four printing systems. It accepts a choice of four different cartridge-based printing systems, designed to tailor your output to your printing needs. Two are included in the box as standard.

Photo quality CMYK. The first standard system is four-colour process printing, with driver settings for Economy, Text and Photo. The Canon Colour Image Processing System (CCIPS), and resolution up to 720 dpi, gives you outstanding half-tones by combining pure and process blacks.

Blacks at twice the speed. The other standard system, specifically for black & white correspondence, is an unusual feature.

It is a dedicated, extra large black ink cartridge with 128 print nozzles capable of printing two text lines at speeds up to 510 characters per second.

Don't be confused. Many manufacturers make all sorts of claims about pages per minute. But, in reality, using their own characters per second ratings, you'll find that the BJC-4200 can be more than twice as fast! (Also see output chart.)



Canon's exclusive PhotoRealism. Third, there is Canon's unique PhotoRealism. This option is more than just a claim, it is fast becoming the photo quality printing gold standard.

500% more colour combinations. Special low-density inks can vary the amount of saturation per pixel so that a single dot could have 0%, 33%, 67% or 100%. This produces up to five times as many colour combinations as conventional CMYK inks.

Virtually no pixelisation. The result is better half-tones and more subtle colour gradations, with almost no visible grain and dots, even in areas of low colour density.

Canon Customer Care. All Canon printers feature a one-year warranty, upgradeable to three years for minimal cost, and are backed by Customer Care hot-line support. Finally, our fourth ink system, Fluorescent ink, is also an option, and drivers are available for DOS, Windows 3.1x/95 and Windows NT.

If you would like to learn more about tailoring the highly versatile BJC-4200 to your printing needs call us on 1 800 021 167.

Price as shown is the recommended retail price, including tax. Canon Australia Pty Ltd ACN 005 002 951. Canon, the Canon logo and BJC are registered trademarks and PhotoRealism is a trademark of Canon Inc. All other trademarks are the property of their respective owners. Competitive print speeds are the actual published character per second ratings of the respective manufacturers. CS/4896

Now only $299 RRP

Canon

From low-end photo editor to real competitor to Photoshop.

Jasc Paint Shop Pro 5

Jasc Software's Paint Shop Pro is a remarkable program: it has a range of features and functions that would normally only be found in expensive, professional image-editing programs like Adobe's Photoshop, yet it costs only a fraction of what those programs cost.

The latest version of Paint Shop Pro (Version 5.0) adds even more tools to what was already a very useful program, including just about everything you could want for photo retouching, painting, and image and colour enhancement.

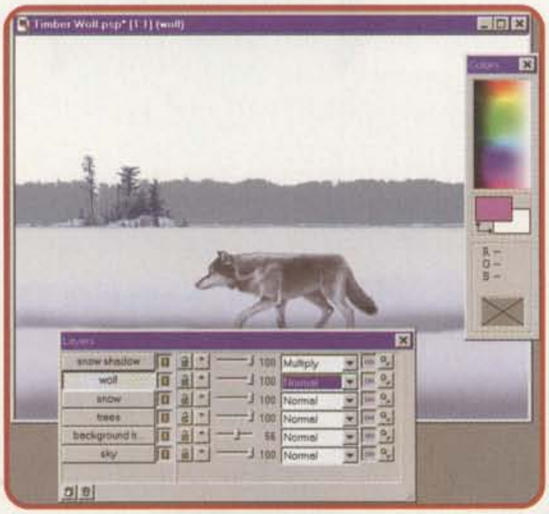
One of the major new features in this version is the new image animator, Animation Shop. It uses wizards to ensure that even inexperienced users can create animations quickly. As well as simple GIF animations, relatively complicated image and text transitions can also be created. Best of all is the optimisation wizard, which ensures consistent colours and also optimises your animations so that they download quickly on the Web.

Also new in Version 5.0 are transparent 'layers', which allow separate parts of your image to be assigned to different layers that can grouped, named, made visible or hidden. The new layer palette allows users to add, duplicate, delete, arrange, view, merge and perform other layer operations. It will also let you control the characteristics of your layers by varying their opacity, changing their order, locking them, and so forth.

Paint Shop Pro's developers have also worked to make the program more useful for owners of digital cameras. It now has direct support for Kodak DC40, DC50 and DC120 digital cameras. Other new or improved input options include better support for TWAIN-compliant scanners and for pressure-sensitive digitising tablets. Another useful addition to the software is that it now allows the creation of CMYK colour separations directly from within the program.

Unlike some of its more expensive competitors, Paint Shop supports multiple levels of undo (they are only limited by the available hard disk space) and like Micrografx's Picture Publisher, offers a 'history' list which shows the sequence of actions you've carried out on your image. This feature allows a series of actions to be 'undone' at once.

Several new selection tools have been added to those available in previous versions. Existing tools, such as the various 'retouching' brushes, have been extended to include such options as dodge and burn (selectively lightening or darkening the image). The retouch brushes can also be used to adjust the hue, saturation or lightness (HSL) of an image, and you can also adjust HSL towards a specified target colour. The only slight problem we encountered with these tools was that the changes made with the default settings were much too dramatic, yet changing the settings was made slightly awkward because the options dialog box had too many controls crammed into a small space.



snow shadow 100 Multiply
wolf 100 Normal
snow 100 Normal
trees 100 Normal
background h... 56 Normal
sky 100 Normal

Adjustable cropping and Free Form deformation tools have also been added. And the program's image manipulation capabilities have finally caught up with its competitors, now that standard effects such as blur, gaussian blur, sharpening and unsharpening have been added. There are some new special effects that should prove particularly useful to Web designers, such as the 'buttonise' filter, which adds a 3D bevel effect to an image — an ideal way to create buttons for Web pages. And if the program's built-in special effects and filters aren't enough to get the effects you're after, you can also use industry-standard Photoshop-compatible plug-ins with Paint Shop Pro 5.

If imitation really is the sincerest form of flattery, Fractal Design — which created the Painter program — must be feeling very flattered, because Paint Shop Pro is the latest in a growing list of programs to imitate Painter's Image Hose. Paint Shop calls its version 'Picture Tube brushes', but the principle is exactly the same: selecting this tool allows a series of small bitmap images to be 'sprayed' onto an image in random or repeating patterns. Picture Tubes allow complex, textured patterns — such as piles of coins, pebbles or leaves — to be built up rapidly by simply dragging the mouse around the image. New Picture Tubes can be downloaded free from Jasc's Web site or you can create your own by scanning in a selection of images.

Paint Shop Pro 5.0 now supports almost 40 different file formats (including TIFF, JPEG, Kodak Photo-CD, PCX, Photoshop's PSD format and GIF).

Ease of use was a little difficult to assess because we tested a beta version of the software and the accompanying Help files are not yet complete. No printed documentation was supplied with the beta either, but judging by the Help files that are complete, Paint Shop Pro should be fairly easy to learn and use, particularly for anyone with previous image-editing experience. Performance was also a little difficult to judge, again because this is unfinished code, but apart from the Picture Tube brushes (which were distinctly sluggish), we found that most operations completed at a fairly satisfactory speed on our test system (a Pentium Pro 200 with 128M of RAM, running Windows 95B).

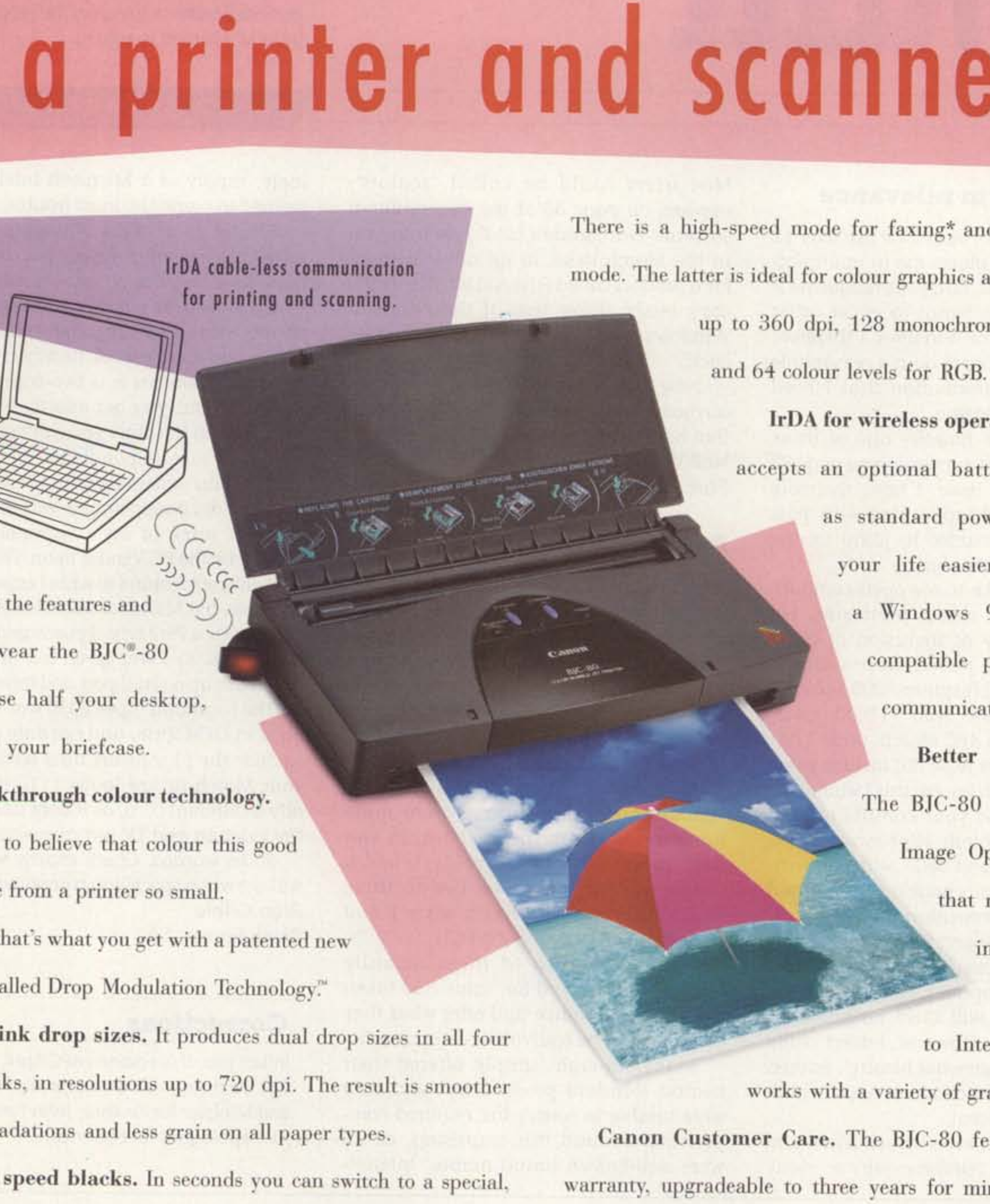
Jim Endersby

Jasc Paint Shop Pro 5

Distributor	Communiqué Software
Phone	(02) 9622 5624
Price	$169
Online	http://www.jasc.com
In short	An excellent upgrade to a program which was already superb value for money.

The other half of your portable office, because it can be both

a printer and scanner.



Read the features and you'll swear the BJC®-80 would use half your desktop, not half your briefcase.

Breakthrough colour technology. It's hard to believe that colour this good can come from a printer so small.

But, that's what you get with a patented new process called Drop Modulation Technology.™

Two ink drop sizes. It produces dual drop sizes in all four CMYK inks, in resolutions up to 720 dpi. The result is smoother colour gradations and less grain on all paper types.

High speed blacks. In seconds you can switch to a special, black only cartridge with 128 print nozzles. It offers laser-like speed and text smoothing for highly finished correspondence.

Send a fax, scan in colour. Next there's the optional colour scanner head. You can simply substitute it for the printer head. There is a high-speed mode for faxing* and a high definition mode. The latter is ideal for colour graphics and OCR, and reads up to 360 dpi, 128 monochrome levels for OCR, and 64 colour levels for RGB.

IrDA for wireless operation. The BJC-80 accepts an optional battery pack as well as standard power. And to make your life easier, it comes with a Windows 95 infrared IrDA compatible port for cable-less communication.

Better Internet images. The BJC-80 even includes an Image Optimisation feature that reduces the jagged images and faded colours common to Internet images, and works with a variety of graphic applications.

Canon Customer Care. The BJC-80 features a one-year warranty, upgradeable to three years for minimal cost, and is backed by Customer Care hot-line support. Drivers are available for both Windows 3.1x/95 and Windows NT.

To learn more about the other half of your portable office, call us on 1 800 021 167.

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* Fax function requires appropriate software and Windows 95. Price as shown is the recommended retail price, including tax. Canon Australia Pty Ltd ACN 005 002 951. Canon, the Canon logo and BJC are registered trademarks and Drop Modulation Technology is a trademark of Canon Inc. All other trademarks are the property of their respective owners. CS/4446

BJC-80 – $499 RRP

Canon

Forum

We welcome commments and suggestions. Send correspondence to *APC* Readers' Say, PO Box 37, Sydney 1028; or by email to: APC@acp.com.au.

All correspondence becomes the property of *APC* and is subject to editing.

Multiplatform relevance

I have been a reader of *APC* for just over 12 months. My work places me in multiplatform environments, and your magazine is one which does attempt to cover other platforms outside of Windows. I therefore have an opportunity to gain a reasonable amount of the information that I need from just one magazine.

However, I am happily one of those 'Mac zealots' that you mention on page 87 of the March '98 issue. I have therefore been somewhat disappointed with past issues that have tended to jump on the Apple-bashing campaign.

I would also like to see open comparison of machines across platforms. For example, by way of inclusion of a G3 PowerBook in the performance comparisons with the Dell Inspiron 3000 M266XT and Gateway 2000 Solo 9100XL notebooks [featured in *APC* March, page 32].

But your March issue did include some very good Mac articles. For this I would like to thank you and your contributors, in particular Dan Tebbutt. His Newswire article on Rhapsody and BeOS was well written, and his Two Bits page a very fair and well-balanced commentary.

Simon Vandore and Helen Dancer also gave a balanced comment by mentioning that all Apple computers, right back to the very first model, will have no problems with the Y2K bug. However, I don't really think that it is 'somewhat bizarre'. Rather, it's just another indication of Apple's ability to 'Think Different'.

What I consider somewhat bizarre, and something which reinforces why so many Mac users could be called 'zealots', appears on page 33 of the International Software Warehouse's catalogue insertion in the March issue, in an advertisement for a product called First Aid 98. Part of the copy reads: 'Fixes tens of thousands of Windows problems with a single mouse click'.

Now I ask you in all honesty, why would anybody want to use an operating system that has tens of thousands of problems?

Neil Weston
Port Vila, Vanuatu

Buyers beware

When buying a new PC recently, I was tempted to go for a quality name brand, but the PC is for home use and the cost wasn't justified. However, I didn't want a 'no-name' package with components selected only for price. So I decided to do my own research and determine the most suitable specification for my needs.

I faxed my requirements to 12 local PC vendors and the responses were quite interesting. Two responded within two days, most took four to five days, and a couple of stragglers took two to three weeks (the last coming in after I had already taken delivery of a PC).

While only two of them actually offered what I asked for, some had taken the trouble to source and offer what they considered to be equivalent components.

Many, though, simply offered their nearest standard product and said they were unable to source the required components. I found this surprising, as all were well-known brand names. Interestingly, supply of a Microsoft IntelliMouse seemed to cause the most trouble.

Clearly, most of the PC suppliers I contacted are geared to supply package deals built down to price points — for example, $1,999 — and are not very interested in customers with specific requirements. Specifying brand and model numbers for the major components is a two-edged sword. On one hand you get exactly what you want, but on the other you can't expect the vendor to take responsibility for the suitability of the system for your needs.

What did disappoint me was the discovery that some of my components were sourced by the PC Vendor in an 'OEM' form with different features to what I expected. For example, the Microsoft IntelliMouse is only supplied as a PS/2 type if purchased in a full retail pack, so I was given a serial mouse which ties up a serial port and interrupt.

The Diamond Viper V330 was also supplied in OEM form, and not only does this exclude the 11 software titles referred to in your March review [page 111], it is actually a different card, as it does not include the video-in and TV-out connectors.

So be warned. Check exactly what you will get when specifying components.

Alan Gilbie
Black Forest, SA

Corrections

In last month's edition (*APC* April, page 76) we misspelled the name of the Federal Minister for Finance, John Fahey. *APC* apologises for the error.

COMPUTERS

NOTEBOOKS

FLAT-PANELS

KEYBOARDS

MICE

FOR HARSH COMPUTING ENVIRONMENTS

☑ SPLASH PROOF
☑ HOSE-DOWN
☑ RAIN
☑ DUST
☑ DIRT
☑ GREASE
☑ VIBRATION
☑ SHOCK
☑ DROP
☑ TEMPERATURE
☑ HUMIDITY

BUILT TO NEMA, IP AND MILITARY STANDARDS
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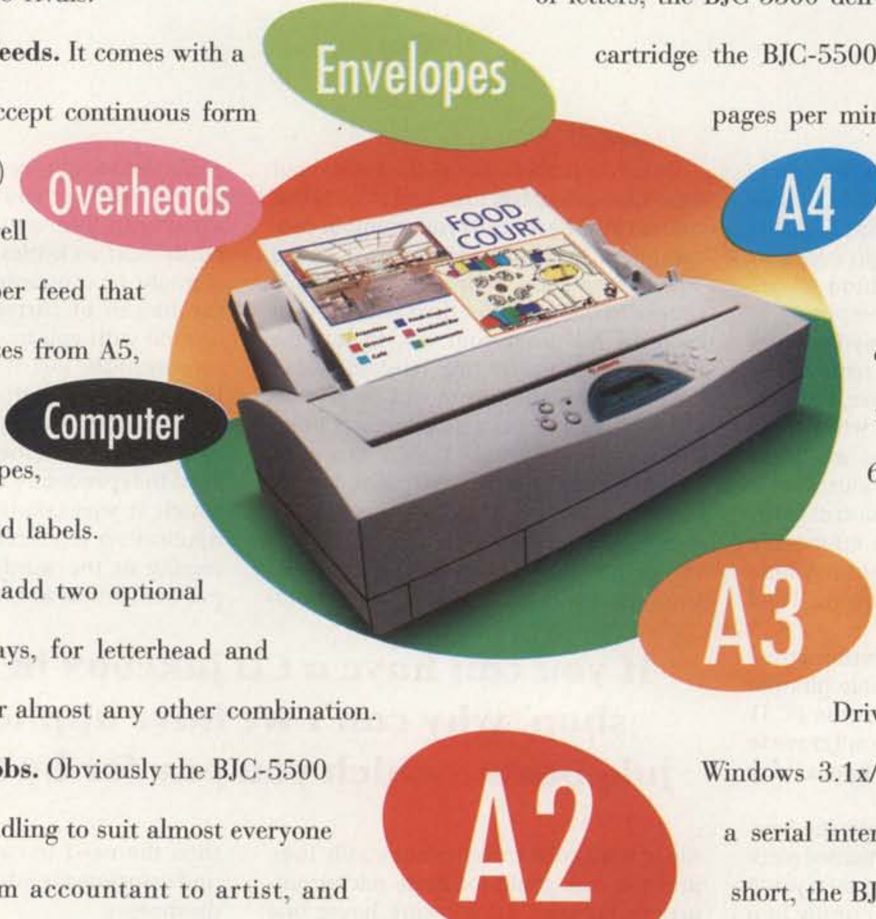
sales@softwire.com.au www.softwire.com.au

Softwire
part of the Softwire group

With high speed and up to 4 paper feeds you can feed it almost anything.



When it comes to devouring stacks of paper, the BJC®-5500 has no rivals.

More paper feeds. It comes with a tractor feed to accept continuous form (computer paper) as standard, as well as a manual paper feed that will accept all sizes from A5, A4, A3 and A2, through to envelopes, transparencies and labels.

Plus you can add two optional cut-sheet feed trays, for letterhead and standard paper, or almost any other combination.

To do more jobs. Obviously the BJC-5500 has the paper handling to suit almost everyone in the office from accountant to artist, and engineer to receptionist.

Its appeal is further broadened by the fact that the BJC-5500 is also an exceptional four-colour CMYK printer capable of producing text and graphic lines in resolutions up to 720 dpi.

At higher speeds. Whether the accountant needs to produce a long spreadsheet, or you want to print a number of letters, the BJC-5500 delivers. Using the special black cartridge the BJC-5500 can print close to 7 B&W pages per minute in high speed, or more than 5 pages per minute in high quality mode.

It even offers an ultra efficient Economy Mode that reduces ink consumption by 67% vs. high quality mode.

Extra versatile. Both colour and B&W cartridges are included as standard.

Drivers are available for DOS, Windows 3.1x/95 and Windows NT. Even a serial interface option is available. In short, the BJC-5500 has enough features to suit everyone's tastes.

Canon Customer Care. All Canon printers feature a one-year warranty, upgradeable to three years for minimal cost, and are backed by Customer Care hot-line support. To find out more about Canon's large paper handling capabilities, call us on 1 800 021 167.

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BJC-5500 – $1,499 RRP

Canon

FutureDesk

Next time you travel, only take with you what you really need.

By Helen Dancer

I'm getting on a plane this afternoon. It's been a while, so I'm quite looking forward to it. It's only for an overnight event, so I'm rationalising. The first thing to go? You guessed it, the portable computer.

I'm taking the PalmPilot, my Paddington Bear tag equivalent which reminds me daily who I am and where I live, but also who I'm to meet with and what their phone numbers and addresses are. But it doesn't provide me with serious article writing capacity, and (my version at least) isn't email enabled. So I'm effectively incommunicado, limited to writing little notes and discrete sentences until I get back behind a keyboard.

But I'm pining for the Pythonesque fjords after seeing a remarkable glimpse into the future of travelling, at the PC IT 98. It's called a PowerDesk. I don't crave to own one, but I do want all the hotels I stay in to.

At first glimpse you'd mistake the PowerDesk for just another sophisticated piece of designer office furniture, but then you'd notice the TFT screen sitting jauntily in a matching wood swing frame on top. That's the only visible clue that the desk actually conceals a computer. Think of the application, not only in executive offices, but in every business hotel room you're ever likely to visit.

Imagine arriving at your destination today, tomorrow, next month. What's the first thing you do? Hang up your suit, or untangle the cords and plug your notebook in, take the line out of the phone and plug it into your modem jack? It's a close call. Imagine, now, in the hotel room of the future, after hanging up your suit, you decide you want to check your email. You take a smart card out of your pocket, swipe it through a panel in the top drawer, and the TFT screen crackles to life. You type in your password, and slide out onto the Net, and back to your home server.

When you check out of the hotel, your computer usage, Net time and so on is calculated just the same as your minibar consumption, and presented as part of the bill. Alternatively, your smart card could choose to bill your Net time back to your monthly bill from your ISP, in just the same way as the Telstra Telecard allows you to make calls from public phones charged back to your home phone number.

Right now, the PowerDesk is loaded with a suite of applications which the manufacturer has decided are the default choice for most business users, but the smart card of the future could carry a profile of what each traveller habitually uses, and the desk could facilitate microtransactions between the software house and the user for the part-time access to a licence of that particular application. If you can have a CD jukebox in a coffee shop for which you pay $1 a song, why can't we have applications jukeboxes either physically at the hotel or somewhere out in cyberspace which you pay by the hour to use your application of choice?

If you can have a CD jukebox in a coffee shop, why can't we have applications jukeboxes, which you pay for by the hour?

Maybe I'm indeed falling prey to the elegant Mr Ellison's notion of information served to empty client devices by some big brain in the background (managed by his database software — don't forget that part), or to Steve Jobs' notion that the next generation of Apple device will have no moving parts other than the keyboard and the mouse. But it certainly makes sense. The empty client device doesn't then have to be something that you'd carry around with you, as long as you're reasonably certain there's going to be one wherever you're going, in just the same way that most hotel rooms currently offer us kettles and television sets. It might be a quantum leap to get over the notion of carrying your hardware around with you in order to access your information, but it's probably a logic leap based on the traditional notion that the information can't exist independently of the document, or the document exist independently of the application in which it was created. If we make the application repository as much a commodity as the wardrobe into which we put our clothes when we get to the hotel, then the need to carry the application, and associated hardware around with us, disappears.

And when one of the most pressing corporate problems associated with the widespread use of notebooks is security — not just of the physical notebook, but the potential damage that could result from the loss of confidential information — then the option of carrying your corporate data and work in progress around on a smart card instead of a couple of kilos of plastic and silicon begins to look very attractive indeed.

We're continually being told to think of the computer as a commodity item. Here's an opportunity to see if it has, in reality, the potential to be so. After all, a chair is a commodity, and when I travel I certainly don't even think about taking my chair with me, even though I'm reasonably certain that I will want to sit down when I get to wherever I'm going.■

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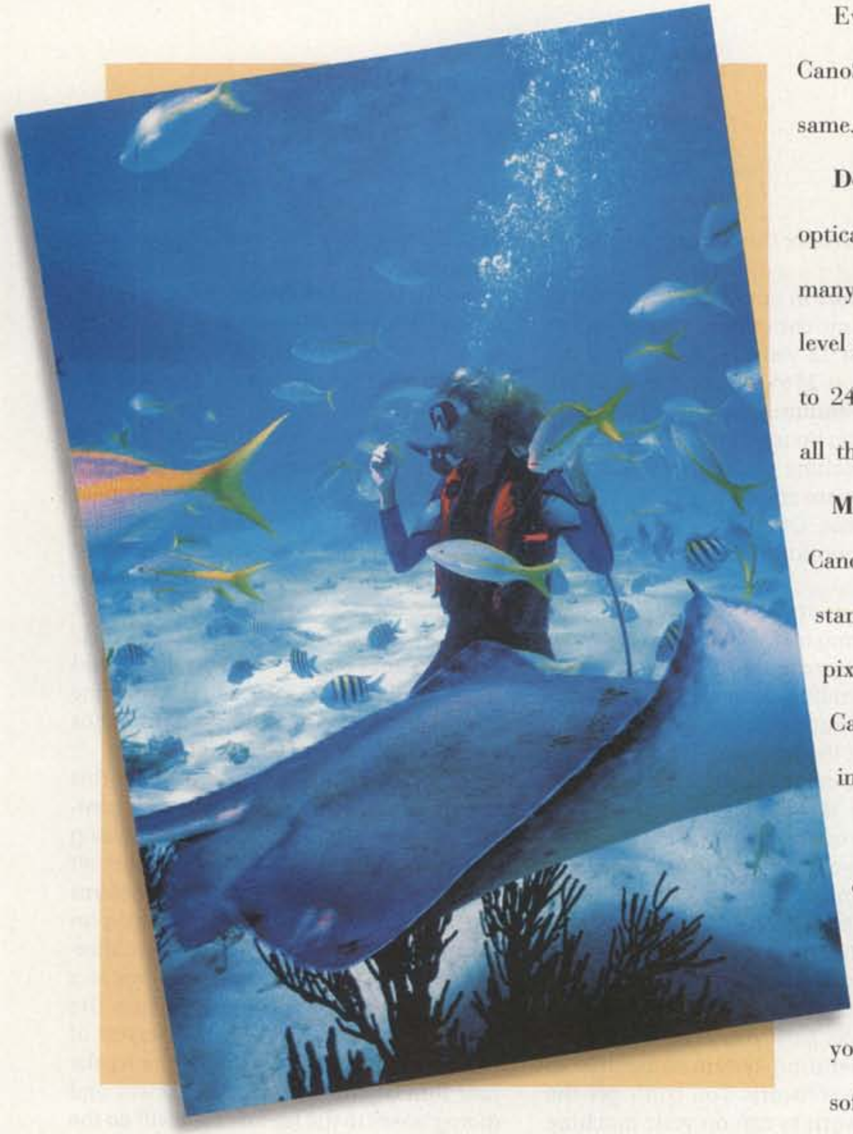

Even a quick glance at the incredibly small foot-print CanoScan™ range suggests that not all scanners are quite the same. Look more closely and you'll find even bigger differences.

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Canon Customer Care. All CanoScan scanners feature a one-year warranty, upgradeable to three years for minimal cost, and are backed by Customer Care hot-line support.

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Model	CanoScan 300	CanoScan 600
Interpolated Resolution	Maximum: 4800 dpi	Maximum: 8000 dpi
Enhanced Resolution	1200 x 1200 dpi	2400 x 2400 dpi
Optical Resolution	600 x 300 dpi	1200 x 600 dpi
Colour Input	27-bit (9-bits per colour)	30-bit(10-bits per colour)
RRP*	$439	$799

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No more Moore

What happens if Moore's law fails? What will we do if next year's computer is no more powerful than this year's?

By Jeremy Horey

Intel has released its 333MHz Pentium II chip and now all PC makers are out showing their new machines based on this chip. These machines make my current Pentium 166 look like it's sitting in a hole. But even my Pentium 166 makes the old 286 I use as a footrest look pretty sick.

For the past 14 years, PCs have progressively become more and more powerful. It is a cliché to say that today's PCs are more powerful than the mainframes of a few years ago, but it is true. Today's PCs are more powerful, have more memory and more disk storage than any of the mainframes that I worked on in the late '70s and early '80s.

And its true that there is a lot more performance to be squeezed out of the current technology before microprocessors reach their physical limits. We have probably another 10 years of development left before transistors get so small that they run into problems that really don't have a solution. In those 10 years we will see chip performance double six or seven times. They will run at thousands of megahertz, not hundreds, and deliver the power of seven 333MHz Pentium IIs.

But after that, computer makers will need to adopt radical new technologies to build faster computers. It may well be that this new generation of computing device will depend on new sorts of computer architecture that is radically different to what we have today. This new class of device may solve different sorts of problems to those that PCs have solved. For example, these new devices may depend on fuzzy logic. Fuzzy logic is good for building systems that can understand human speech, but not so good for building accounting systems.

There is something comforting about all this. In a decade, perhaps, I'll be able to buy a PC that I can keep for more than three or four years. I may have a computer with software that I can really get to know.

If you think I'm not enthusiastic about upgrading my computer, you're right. Over the past 12 years, I have owned an 8086, a 286, a 386SX, a couple of 486es and now a Pentium. Each time I change, it's like moving house. I have to move data from one machine to another. I have to reinstall software and also get used to new system software. Often there is a new keyboard and monitor to come to grips with as well.

But I have to keep up. With each machine I hang on for as long as possible. But the pressure mounts. It starts with somebody sending a document that you can't read because you haven't got the latest version of the software. Then suddenly everybody seems to have the next word processor or the next spreadsheet. You have to keep asking them to save things in the old format and even then you still have problems.

After a while, if you still hold out, you find that there is a new version of the operating system. You can no longer just upgrade your word processor or spreadsheet package. Now you need to upgrade to a new operating system to be able to run the new software. You can't get the things you want to run on your machine because it isn't running the new operating system. Then you find that you have problems getting appropriate hardware. The new modem doesn't have a driver for the old operating system and so you can't take advantage of its faster transmission speed, or your word processor doesn't support the new printer you've just brought home. In fact, because the printer only works properly with a later version of the operating system, there is only a single printer driver with the machine.

And then eventually you do spend some time on a new fast machine. Perhaps your machine at work is upgraded, or a friend gets a new box and you help them set it up. You start to wonder why you have been so stubborn. From there it's a short time until you are unpacking a new computer yourself and going through the whole upgrading routine again.

Once you have been through the exercise, and have sorted out the teething problems, life is so easy again. You wonder why you dug in your heels and wouldn't take on a new machine. It all seems so fast and easy after it's sorted out. The new software isn't that hard to learn and it does do some useful new things. The cycle starts again. You can't see why you would have to upgrade again as this machine does everything you could ever want at as fast a pace as you need.

Everybody has come to rely on this stream of more and more powerful computers. Software developers are writing software that needs this power to get off the ground. Today's PC operating systems are multilayered beasts that consume processing power in great gobs. The user interface with its pretty colours and graphics needs a powerful processor. Then the applications software with their layers of features need that interface just to let the user find a path through the menus and dialog boxes to the feature that will do the job they want done. Add to this a new range of visualisation software and voice processing software, and the power available in the 1,000MHz Pentium VII won't look so awe-inspiring.

But at least for the user there will be a break. At least we can look forward to a few years of peace when we can all agree not to change our word processor or spreadsheet until the next generation of computers comes out.

Now, I wonder when I can justify getting a 333MHz Pentium II?

You can reach Jeremy Horey at jhorey@ozemail.com.au.

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"If you will be using a digital camera often in your work…the best choice is the PowerShot 600…" PC Magazine, Australia, March 1997.

"Of all the digital cameras we've tested, Canon's produces the best looking images…" Australian PC World, April 1997.

"The first digital camera we've seen (that) produces sufficiently high resolution and high quality images to survive digital manipulation…" Windows Sources, July 24, 1996.

"… (in its price class) the PowerShot 600 is overwhelmingly the best choice." PC Magazine, US, January 1997.

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PowerShot digital cameras – from $629 RRP

Canon

The human touch

Technology is racing into the home straight, but there are several human hurdles yet to overcome. **By Jeremy Torr**

I went to the Melbourne Grand Prix. Nothing personal about it — no burning ambition being fulfilled. A major computer company had a couple of tickets, so I went with my best friend and we had a pleasant time sipping wine and nibbling beef and cheese.

The racing was OK, and I was pleased to see Villenueve way down the field, but the most amazing thing about the whole day was my encounter with OneLink's new MetCard system. To make our own small contribution to the minimisation of vehicular congestion, we travelled by train.

This was the first time I had travelled via stations where the whole MetCard shebang had been installed — ticket machines, auto-ticket-operated gates and the busy hum of computers in the background reassuring the public all was being capably handled by the infallible microchip. Which it probably was.

The chips were busy doing their electronic validation and checking business as best they could. However, the people who designed the interface between said chips and the ebbing and flowing communter tides obviously hadn't done their homework. The OneLink system is the most glaring example of bad design I have come across in years. It is so bad it gives computers a worse name than they have already.

We knew what zones were, we knew what a concession was, we even knew what a $20 note looked like and what station we wanted to get to. But the ticket machine stumped us. It used an unbelievably small LCD display to advise us that "this denomination was not suitable for change", despite the written instructions on the outside of the machine to the contrary (pictograms would have been too helpful). This was after several minutes of trying to divine some logic in the layout of the buttons, sequence of pressing, money insertion and feedback information on the tiny screen. After a couple of fruitless tries we bought a two-person MetCard Saver from a nice man at the counter. Relieved and not a little nervous, we boarded the train. At the other end, we used our joint MetCard to leave at Flinders Street station. Unfortunately, only one of us could exit through the automated barrier, unless the other waited for 10 minutes before using the (so-called family) ticket to be re-validated. The man on the barrier told us to just walk out without using the ticket.

So here we have a system that confuses locals (just think how terrifying it would be for overseas visitors), can't cope reasonably with the tickets it issues, and requires extra staff to assist so it can get people on and off trains. I know it has its detractors, but the ferry system at Circular Quay in Sydney is a thousand times easier to use, and in most cases it actually works. The OneLink designers ought to be hung, drawn and quartered for the folly they have perpetrated on the Melbourne public.

The OneLink system is the most glaring example of bad design I have come across in years.

But enough of the tirade. The issue this little escapade brought sharply home was that the design of computing devices has now become so good that the workability of the device as a whole depends not on the computing power and programmability of the computing parts, but much more on the way it interacts with the people that use it. Could it be that a whole new science is waiting to be discovered here, not ergonomics, but ergonometrics (the way computers accept and feed back information to users)? A good example of this is the mobile phone. The companies that make them can now get the internals down to such a size as to fit them into a wristwatch. But most phones are still the same size in most cases, because the limiting factor is not the width or weight, but the ability to dial with one hand — and read the number on the screen. Make the buttons too close together and the thumb simply can't bend enough to press the number buttons accurately. In the same way, the most you might expect on a modern printer is a power switch, possibly a feed button, but no more. All the controls are processed through the computer the user is working on, not by navigating around an array of lights and buttons, all with their own commands.

Which brings me back to the MetCard fiasco. If the designers were to have a look at a contemporary VCR, microwave oven or sewing machine, they would find a host of better design examples than the computerised blight they have slapped onto the front of a stainless steel slab and called a ticket machine. If they were to check the height children need to be to push money into slots, view an information screen and push buttons, if they included a map of the area with colour-coded buttons or area-related numbers, there would be some hope. As it is, the interface is, frankly, hopeless.

All the computing power in the world is of no value unless the people it is designed for can access it easily.■

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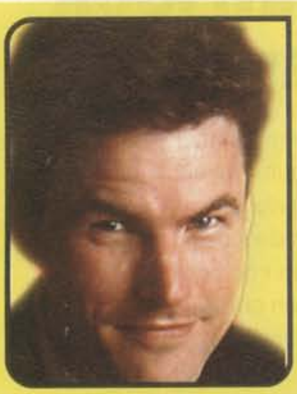

Browsing at the bookstore

Buying a book online may offer great choice, but none of the power of person-to-person shopping.

By Bruce McCabe

Several months ago I visited that most hyped of Internet sites, http://www.amazon.com. For some time I had been on the lookout for two history books, having scoured both new and second-hand bookstores without success. After hearing so much about the 'world's largest bookstore' through the IT press, I thought it would be fun to give this avenue a try. Sure enough, I quickly found them on Amazon's database.

I'd looked at this site several times before, but it's strange how you never really notice the details until you actually use a site for yourself. There's nothing like spending your own money to sharpen up skills of observation! The first thing I noticed was just how well the site has been constructed from a marketing point of view. No opportunity has been missed to interest the potential buyer in other books. 'What we're reading', 'Best sellers' and 'Award winners' are just a few of the links located on the home page for this purpose. Cross-indexing is also extensive. As you drill down towards the book you intend to buy, links tempt you to consider new releases on the same subject, the most popular related titles, books by the same author and (my favourite) books most frequently purchased along with the one you are buying. Before you know it, a five-minute Internet shopping trip has turned into half an hour of browsing, just like a real bookstore!

The next thing I paid a great deal of attention to was pricing. First and foremost, I wasn't about to pay double for these books just for the novelty of buying them online. Second, I was keenly interested to see if I could save money, since I consider books in Australia to be very expensive (by my observations we pay slightly more than US buyers, but take a look in both new and second-hand bookshops in the UK and you will be amazed at how much cheaper books are there). I was pleasantly surprised: the prices were significantly cheaper than in Australia. At the online checkout, however, I discovered one catch: postage. As everyone knows, there are two types — surface and air — and boy do you pay through the nose if you live in Australia and want fast delivery! In the interests of keeping to my budget, and taking into account the fact I had already been looking for more than six months, I chose surface postage.

Sending a threatening email will never be as effective as confronting a recalcitrant retailer in person.

Eight weeks isn't a long time to wait, but when you are looking forward to something it goes slowly. I felt a little annoyed when the books didn't arrive on time, and really annoyed after 12 weeks rolled past. When I emailed Amazon asking for an update, I received a prompt reply but it wasn't much help. It basically told me that Amazon.com had fulfilled its part of the deal and dispatched the books on time, that delays beyond 12 weeks were "rare cases", and in any case the delay was now the postal system's responsibility. I gritted my teeth and decided to wait another week (as if I had a choice!). Nine days later the books arrived.

Generally speaking, I was happy with the purchase — once the books had arrived. But what if they hadn't? It served as a small reminder of how powerless the consumer can be in a mail-order situation, when the company holding your money is on the other side of the world. Let's face it: sending a threatening email will never be as effective as confronting a recalcitrant retailer in person. I was certainly more wary of promised delivery times for future purchases.

With all this in mind, I was pleased to learn of the local initiative of Dymocks to 'get on the Net'. The Australian bookseller has already created a site, http://www.dymocks.com.au, where you can search for, and order, books. It has some remarkable similarities to Amazon.com (who can argue with success?), using almost as many book promotion links, the same 'shopping basket' structure, and an identical gift wrapping option, complete with sample patterns. The main drawback is that the books listed are priced identically to those in the stores. A quick check revealed that one of the books I purchased from Amazon.com for $US13.56 (about $19.95) was priced by Dymocks at $34.95, a difference of $15 (although once postage and handling was factored in, the difference came down to $9.70, and Dymocks promised delivery within 14 days).

I understand that Dymocks plans to incorporate a more attractive pricing structure in the near future which will reflect the savings realised by reduced stock requirements. We will have to wait and see, but if prices are low enough to be reasonably competitive with Amazon.com, it will mean higher sales volumes and a lower cost of business for Dymocks. It will also mean I can search for books I want online, save a few dollars *and* show up in person (with an attitude) if my books don't arrive. A win-win for everyone.■

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Conflict of the century

Electronic communication promises to revolutionise our personal and professional lives. But are we taking the right road?

By Cathie Kennedy

Electronic communication is hailed as the key to success as we approach 2000. Organisations can create virtual workgroups by employing highly skilled experts from around the world for a particular project, negating geographic and time restrictions; universities can create virtual classrooms, extending learning opportunities to anyone, anywhere; you can attend a virtual conference with thousands of fellow delegates without leaving your office; and on a personal level you can meet new friends (and even lifelong partners) in cyberspace through online chat sessions.

Sounds like a panacea for corporations in today's competitive environment. Well maybe, but there's a fundamental issue we tend to overlook: we're witnessing a profound shift in the way humans communicate with each other. Electronic communication reduces the need to meet face to face. It's cheap. And it's instantaneous.

US columnist John Dvorak tells the story of Genghis Khan, who appreciated the benefits of fast transmission of information. To send a message, Khan positioned horses every 30 kilometres, so when one horse became tired the rider could hop on the next. The riders would travel 300km each day, which was a big deal back in 1200AD.

Like the advent of the printing press, the impact of electronic communication is going to take years — maybe decades, maybe centuries — to be fully realised.

Let me digress. I have recently been involved in authoring a university course offered via the Internet. Nothing revolutionary; the Web is rapidly becoming one of the most popular methods of disseminating distance learning programs. However, three issues caught my attention.

First, the university decided to provide students with a hard copy of the entire unit, seemingly oblivious to the fact that information is no longer an item that has to be transported; it can be available instantaneously, anywhere. My inclusion of hypertext links and video clips within the course material immediately became a futile exercise.

Information designed for the Web should be more than just uploaded documents. It needs to be designed specifically for the medium, capitalising on the Web's interactive nature. This is a common occurrence in the business world, where many companies believe a Web site is simply a scan of their corporate brochure. It's akin to trading in your bicycle for a car with a V6 engine, yet refusing to change from first gear. If we're going to invest all that money in new technology, we should ensure we use its full potential.

The difficulty we seem to be facing today is how to facilitate teamwork when the very nature of electronic communication conflicts with it.

Second, it became necessary to include an introduction to the Internet as the first session, as many students — who were postgraduates — were experiencing this new medium for the first time. They had little understanding of how to access the Internet, the potential of the Web as a research tool, or how to initiate or participate in online chat sessions and discussion groups with fellow students.

Electronic communication is not an effortless switch. Right now, it's like a Stanley Steamer: you need to know too much about it to get it to do its tricks. Therefore, ease of use, a truly intuitive interface, and user education are key factors to its success.

The third issue was that students expressed disappointment with tutorials because they couldn't meet face to face. The difficulty we seem to be facing today is how to facilitate teamwork when the very nature of electronic communication — that is, negating the need to meet in person — conflicts with it.

Yet this type of many-to-many communication, in other situations, fosters a strong sense of teamwork and open dialogue because suddenly the absence of visual cues — status, role, colour or creed — reduces any inhibitions.

There are numerous examples where electronic communication has resulted in the formation of virtual workgroups that have produced exceptional results. The success of the award-winning film 'Babe' is a classic example. While all post-production work for the movie was carried out in Sydney, most of the special effects were completed in the US. The Australian team sent negatives over an ISDN link to the US where the effects were added, then the Americans would send the digitised and animated images back to Sydney over the line.

I love my laptop. I love my electronic mail. I love the fact that I can communicate with my friends in London, San Francisco and Shanghai several times a week for very little cost. We can share the events of our week, send ecards and transmit photos. But this technology will never totally replace face-to-face communication or physical contact. It can act as a supplement but never a substitute.

So should we be trying to *change* the way we work to take advantage of electronic communications? Perhaps for now we should take a step back and seek ways to use electronic communication to *complement* the way we work. That is, until the Stanley Steamer evolves into something akin to the cars we drive today.■

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The year my voice broke

1971 was an important year. In 1971, personal problems notwithstanding, I got wired.

Julian Ehrlich

In 1971 it seemed my zits would go on forever. In 1971 Older Women (18+) would eagerly embrace me as a partner at last. In 1971 I had my first experiment with the wired home and *knew* the Future.

But there were a few problems. Zits, with lives of their own, had every intention of staying. It took years for me to simply bury them under a beard. Older Women, also with lives of their own, disregarded the logic of frantic adolescent males. Any solution to that problem was years away.

But the wired home? In 1971 the wired home arrived!

Was it the genius of my old friend, Leon Cunio? Or was it mine? At 16 we were consumed with wanting to know what girls talked about when they scooted into corners at parties. They were so motivated, dedicated, to this task of sharing . . . sharing . . . what?

An engineering problem produced an engineering solution: Leon and I wired the house.

Microphones everywhere. Cables galore. Headphones plugged into the panel at Central Control allowed switching this way and that, promised the Answer. We would know What Was Going On.

This was a marvellous education in analog sensing taking many hours, much cable, and many borrowed bits and pieces. Could speakers, with the same symbol on circuit diagrams as microphones, be wired like microphones? Yes! But despair pounced.

The first unit we rigged up between kitchen and bedroom had this repetitive buzz crackle, buzz crackle. Meters here, soldering there, couldn't eliminate the buzz crackle, buzz crackle.

Finally, retreating to the kitchen for sustenance, we sat staring at the reluctant speaker/microphone. And noticed. The faintest clicking from behind — identical memorised rhythm, but now a brrrrr click, brrrrr click . . .

There, on the wall opposite our oversized microphone, was the electric kitchen clock, the faint whirrings of its mechanism easily detected by the dinner plate-sized woofer cone so that a spectacularly strong signal thumped and boomed its way along our wires to the amplifier. A quick check and yes, the volume on the amplifier was way down. If we'd turned the volume up we would probably have been able to hear the ants on the window sill.

Guests expressed sympathy that, in spite of all those speakers, we hadn't been able to get music pounding through the whole house. But Leon and I knew better. Everything worked. Throw a switch and the kitchen channel opened; *flick* and back porch secrets were revealed; *flick* hallway whispers exposed (at least as long as no-one was breathing within 5m).

As avid science fiction readers and determined tinkerers, we felt we were standing on the edge of Amazing Things. We fantasised about having a computer run the house as computers ran star ships. We caressed the notion that the then new cable TV in the US would mean not three or four TV stations but hundreds!

A Dick Tracy wristwatch-sized phone would be great. And *then* Dick got himself a wristwatch-sized videophone!

The Anglo-French Concorde consortium was racing the US Supersonic Transport (SST) to dominate the skies while the Germans and Japanese were making good progress towards deploying magnetic levitation trains — silent, fast, floating millimetres above special track.

'2001: A Space Odyssey' was only a few years old and we had calculated (many times to check!) that, in 2001, *we* would be the age of the people sipping coffee in that orbiting space station. We would be the guys poncing around the Moon and gliding to Jupiter.

Smallpox was destroyed.

We were riding a crest of technical promise. But unlike a water wave that dissipates on the beach, this technical wave would carry us throughout our lives. The twisting copper wires plugged into a bunch of battered speakers was more than a prank. That project put us directly in touch with the spirit of the times!

But there's more to success than mere technology.

Supersonic flight never became a common miracle, that role being magnificently filled by the jumbo jet.

How much smaller are today's dreams. Faster computers. Wired homes. High bandwidth. But I saw the future in 1971.

Magnetic levitation trains were sidelined by endless improvements in steel-on-steel trains. The best French TGV is now only 50km per hour slower than a maglev.

Space, the final frontier, leaked away with military expenditure consuming a generation's creativity, resources, and dreams.

How much smaller are today's dreams. Faster computers. Wired homes. High bandwidth. But I saw the future in 1971. We're turning up the 'information amplifier'. Faster computers — ever bigger information microphones — report more and more. But when you listen, *really* listen, what you hear is the grossly amplified sounds of technology itself — endless talk about the bits and bytes and cool Techno-Talk. Or worse: the gossip, morality, fashions, fantasies, and perspectives of teenagers.

Been there, done that. But that was analog. Maybe if it's *digital* . . . ?■

There was a time when floppy disks were a precious and rare commodity, to be immediately returned if loaned out to share a file . . . but those days are over.

Farewell ye olde floppy

Now that file sizes are measured by the megabyte rather than kilobyte and so little software is small enough to fit onto a diskette, Price Watch this month looks at portable storage/back-up options. Because of the existence of dozens of alternative devices ranging from 100M floppy replacements to 2G cartridges, we narrowed the field to include easy-to-install, hassle-free methods of portable storage. We made our phone calls under the guise of a typical office worker wanting to share documents between our desktop at work and PC at home. We also said that, being the only one in the family with an Internet connection, we wanted to share files downloaded from the Internet with friends and relatives who already owned a PC.

With nearly 13 million drives in use around the world, it came as no surprise that the most recommended solution was Iomega's external Zip Drive. The elegant indigo unit connects to the parallel port and was recommended by nine out of nine vendors. However, the owner of Canberra's Complete PCs had had so many problems with 'the click of death' (a hardware fault Iomega claims only affects 1% of its internal Zip drives) that he hesitated to recommend it and opted for Imation's LS-120 technology known as the SuperDisk.

Interestingly, the majority of vendors made the very valid point that while the Zip isn't the fastest or cheapest solution, it's the most pervasive and therefore the best option for portability. The chance of someone else owning the drive is extremely high. The second most popular suggestion was the Zip's younger sibling the Zip Plus. It costs around $140 more, and offers a speed increase of 20% to 40% if used under Windows 95 with a SCSI card, or 5% using the parallel port. Other benefits are the autodetect feature that enables the same drive to be plugged into a parallel or SCSI port, a smaller universal power supply that makes it far more convenient for travelling, and a long-awaited 'off' button. However, Iomega has positioned it as its corporate product, particularly because it is recognised by both PCs and Macs and it still uses the sturdy blue 100M diskettes.

While still a long way from Iomega's installed base of 13 million, Imation's SuperDisk was also recommended for any-

Continued on page 58

Back-up options

Company	Phone	Recommended	Capacity	Adaptor	Price	Media
All Computer Equipment Supplies NSW	(02) 9580 6969	Zip (internal)	100M	IDE	$275	Iomega $31
		Zip (external)	100M	Parallel	$275	Iomega $31
Beyond Computers Vic	(03) 9646 4338	Zip (internal)	100M	IDE	$179	Fujitsu $20
				SCSI	$269	Fujitsu $20
		Zip (external)	100M		$239	Fujitsu $20
Brilliant Computer Solutions Qld	(070) 313 144	Zip (internal)	100M	SCSI	$340	Iomega 3 pack $120
		Zip (external)	100M	Parallel	$300	
		Zip Plus (external)	100M	Parallel/SCSI	$425	
Complete PCs ACT	(06) 241 5604	LS-120 (internal)	120M	IDE	$200	$25
		LS-120 (external)	120M		Parallel	$245
Computerland Tas	(03) 6331 1611	Zip (internal)	100M	IDE	$279	Iomega $27
		Zip (external)	100M	Parallel	$279	Sony/Fujitsu $24
		Zip Plus (external)	100M	Parallel/SCSI	$400	
Dolphin Computer Technology Vic	(03) 9859 8409	Zip (internal)	100M	IDE	$210	Iomega $23
		Zip (external)	100M		$240	
Harris Scarfe SA	(08) 8203 4386	Zip (internal)	100M	IDE	$349	Iomega 3 Pack $89.95
			100M	SCSI	$349	
		Zip (external)	100M	Parallel	$329	
		Zip Plus (external)	100M	Parallel/SCSI	$439	
IT Services Group SA	(08) 8231 0200	Zip (internal)	100M	SCSI	$290	Iomega $25
		Zip (external)	100M	Parallel	$290	
MicroArts Computers SA	(08) 8359 3200	Zip (internal)	100M	IDE	$299	Iomega $25
		Zip (external)	100M	Parallel	$299	Pack of 3 $95
		Zip (external)	100M	SCSI	$299	Pack of 10 $240
		Zip Plus (external)	100M	Parallel/SCSI	$395	

How often do you use magazine reviews to help you make an informed buying decision? **By Roulla Yiacoumi**

Some things change, some don't

Computer magazines offer valuable advice when it comes to making an IT-related buying decision. A comparative review, for example, will usually feature a number of similar products which are tested and then stacked up against each other. The features, price and service of the items are thoroughly examined and presented to the reader in a format designed to present all facts fairly so that a confident buying decision may be made.

Some magazines may even award special accolades to products which stand out from the crowd (such as *APC*'s Editor's Choice award). These serve to highlight certain aspects of a particular item which the reviewers found particularly outstanding.

Often, the manufacturers of these products will promote an excellent review in their advertising material. This is helpful for potential buyers who may have missed the actual review but are interested in any recommendations from reputable magazines.

However, if you see any advertisements from companies claiming to have received an award from a magazine, it is important that you make a few inquiries of your own.

Besides checking the authenticity of the claim, check how recently the award was given. If an award was given to a company one or two or three years ago, it means that at that time, the magazine in question thought this item or service was especially impressive. Some time down the track however, things may have changed, for better or worse. Then again, the product or service may be of the same standard. Nonetheless, do not rely on reviews that are well outdated to sway your decision in a fast-changing market.

Even with more recent reviews, keep in mind that magazines begin working on some features three to four months before the date which appears on the front cover of the magazine. This means that some specifications may have changed, as may have pricing. If you are browsing articles on the Web, check the product shipping in the country of the magazine's publication is the same as the one shipping locally. Be sure to double-check all such information before committing to any purchase.

Remember, some things change, and some stay the same. In a market in which new products and services emerge and change on a daily basis, it is to your benefit to do some very basic research before splurging your IT dollars.

APC received the following letters from two readers:

Dear APC
On the strength of a review in APC, *October 1996, I opened an ISP account with Com-cen, which was awarded an Editor's Choice award for the best-value ISP.*

While I am an experienced Internet user, I had nothing but problems with Com-cen's performance. Whilst online I would be disconnected at least five times in one session — even when I'd only been online for a few minutes. The cost of redials soon added up.

I found their numbers constantly engaged on so many occasions, it was ridiculous! How on earth could they call this service unlimited?

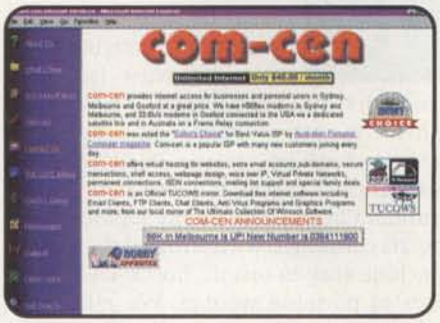
I have since switched to another ISP.

Martin Haynes
Lane Cove, NSW

Dear APC
An ISP named Com-cen is displaying a medallion in its advertising indicating it received an Editor's Choice award from your magazine. On its Web site, it links to this article from the front page, telling the world how super Com-cen is.

Well, I am a Melbourne-based customer and although the price is attractive — there are few flat-raters around nowadays — other aspects for customers which are not Sydney residents aren't exactly fantastic. The Melbourne support number and 1800 number are continuously engaged. I tested the former via Telstra and it reported a possible fault. At the moment, if a Melbourne customer needs support it's either a fax or an STD call. Not that it seems to matter. I have had a number of odd problems since I signed up with them, including inexplicable drops when connected, problems sending email and even the login script they provide on the Web page failing to connect.

I sent faxes about these matters to the company but Com-cen's policy toward Melbourne customers seems to be to ignore them. I have received no replies at all.



As I said, I don't know how they treat Sydney-based customers, but I cannot see how they could possibly have received a good rating from you.

Thom Puckett
Sydney, NSW

Continued on page 58

Tell us all about it

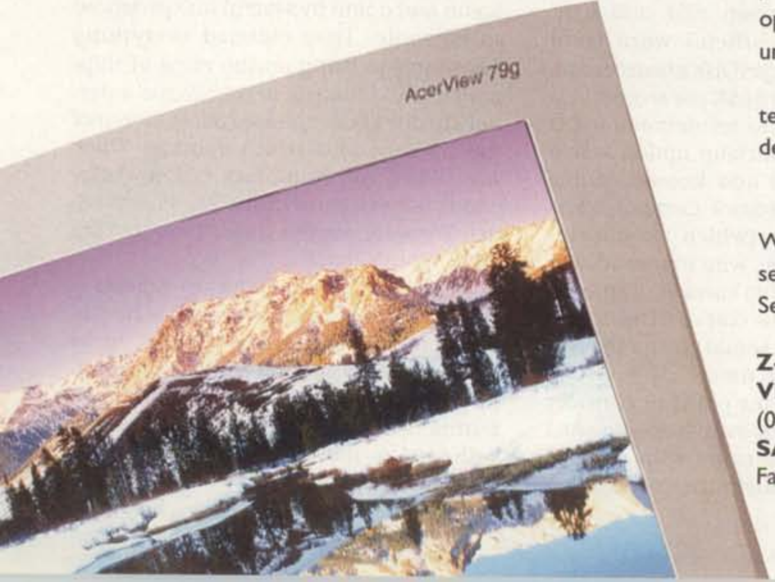
Service & Reliability is *APC's* consumer column. We invite you to send details of your buying experiences to:

email complaints@acp.com.au
fax Service & Reliability at (02) 9264 6320
mail Service & Reliability,
Australian Personal Computer,
Level 8, 54 Park St, Sydney
NSW 1028.

Please keep your letters to no more than 300 words. All letters must contain a full name, address and contact phone number.

APC reserves the right to edit any submitted material for length and clarity.

We can publish only a selection of letters each month and regret that letters cannot be answered personally.



AcerScan Prisa 610s

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The SCSI Card gives total plug and play convenience. There are no jumper settings to worry about. The software is compatible with all operating systems and the AcerScan Prisa 610s is suitable for PC under Windows® 95 and Windows® NT.

The AcerScan Prisa 610s comes with full after-sales service and technical support to ensure maximum productivity, no matter how demanding your workload.

The AcerScan Prisa 310p and 310s are also available.

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SVX 791 APC

APC forwarded these complaints to Com-cen for comment and received the following response:

Dear APC

You will notice that both complaints forwarded to Com-cen appear to be caused by trouble at the customer's site and do not concern the performance once accessed, or are related to claims of false advertising.

Our lines are not constantly engaged. I can arrange for you to have an account with Com-cen for one week if you wish to test this out for yourself. We have found some modems are not 100% compatible with the Cisco 5200 we use and found that the only way to clear the dropouts is to drop the connection speed. Cisco is aware of the faults and release new firmware at least once a month.

Mr Puckett was replied to on at least two occasions that I know of. Regarding his complaint that the Melbourne number is constantly engaged, he is welcome to ring the Sydney number. Not many ISPs offer a freecall number for support. The login script on our Web site page has been there for two years now, so I would say that the fault is at his end. All customers are replied to, as otherwise they will not be able to access the Internet and will subsequently cancel their accounts.

Liam Bal
Manager
Com-cen

Backup

Continued from page 55

one wanting the convenience of portable storage without having to change media format. The SuperDisk offers 120M in a cartridge the size and shape of a regular 1.44M floppy disk and is backward compatible, so the drive will read and write to your everyday 3.5in high-density and double-density floppies at a rate almost comparable to that of a hard disk. Running through the parallel port, it is available internally in NEC's Versa and as an option in Compaq, Dell and Gateway machines locally.

According to the salespeople we spoke to, the SuperDisk is a far superior performer to any Zip product, but its biggest failing is the lack of an installed base. At the time of writing there were around 1 million units in use worldwide, although Imation assured us that around 2,000 were being sold per month in Australia alone, and that a PCMCIA version was just about to hit the stores.

Despite our stated criteria, the odd suggestion was made for Iomega's 1G Jaz and the soon-to-be-released Jaz 2G. Both of these are as fast as a hard drive and connect to the PC via a SCSI card, which costs extra and requires you to open your PC, install and configure the card — not for the fainthearted. Each of the recommended alternatives have their own good and bad points, but shape, snazzy advertising campaigns and cool colours aren't the only factors to consider when shopping for portable storage. Seek time and transfer rates are remarkably important if speed and saving time are issues.

Seek time is simply the period it takes for the drive's head to find an appropriate track on the disk where the information is stored before it can start transferring data. On internal and external SCSI Zip drives the seek time is stated to be 29ms, whereas on the SuperDisk it is 70ms. Transfer rates must also be taken into consideration. This is the speed at which data is transferred from the hard disk to the unit. Iomega claims it is around 0.79M per second for an internal Zip or external SCSI Zip. The parallel version is restricted by the speed of the parallel port, so between 300K and 800K per second is the official word from Iomega, while the SuperDisk's transfer rate is between 290K and 565K per second.

Our charter and method

Price Watch is an exercise in comparative technologies, relative prices and human nature. All investigations are conducted anonymously, and records are kept of conversations. Prices and system capabilities printed here are provided by the sales staff at the offices we contacted, and all information is as supplied. While we assume that these are correct, we cannot accept any responsibility for errors or omissions. Neither will we be held to account by companies mentioned here for omissions to product ranges or system capabilities. The responsibility rests with sales staff to provide adequate information, as the company would expect them to do with every customer.

The only person to recommend a CD writer as a viable back-up option was a wonderfully helpful and knowledgeable salesperson from Bedrock Computer Services in Melbourne (which we haven't included in our table), who suggested that if the LS-120 wasn't big enough to back up our vital files, the low cost of CD-R media (between $3 and $4) would pay for the cost of a CD-R drive in no time.

Another important point to consider is the cost of the removable media used by these drives. All come with at least one proprietary diskette containing installation files, but the cost of additional media should be considered before you make your purchase. The recommended price for Zip disks is between $23 and $26, although Brilliant Computer Solutions in Queensland's price came to a whopping $40 per diskette when averaged out. The average price of LS-120 media is $25.

Price-wise, this month's Price Watch is definitely a lesson in the benefits of taking the trouble to shop around. The prices we were quoted varied so far from each drive's recommended retail price that you would be doing yourself a real disservice if you bought from the first vendor you spoke to. The external Zip has an RRP of $279; the average street price was $277, although the lowest price was $245 from Complete PCs in the ACT and the highest was $329 from Harris Scarfe in Adelaide.

There were even larger differences in the prices of the internal Zip drives. They have an RRP of $279, but prices ranged from $179 to $349 for the more expensive internal SCSI version. The RRP for the Zip Plus is $379, yet the average was a whopping $414. Harris Scarfe was again asking the highest price at $439.

Incorrect information was handed out again and again by several inexperienced salespeople. They claimed everything from Iomega being on the verge of shipping a 120M diskette to the 'classic' external Zip drive being phased out in favour of the Zip Plus, all of which is untrue. There was also a surprising lack of knowledge about the existence of the Zip Plus product. We were greeted three times by "Zip Plus? What's that?".

While the storage/back-up market is still hotly contested, there really is no single standard. The choice is yours, to be made after considering price, your needs, how much information you will be transferring at a time and how likely it is you will need to move the device from your machine.■

How can call centres help improve your IT implementation and overall performance? **By David Braue**

Calling all centres

Although many companies have implemented call centres as largely isolated business units, recent acquisitions of call centre providers by enterprise management software vendors illustrate the growing role of call centres in company-wide service level management (SLM), the latest catchcry for companies struggling to meet the challenge of end-to-end enterprise management.

In the past, most call centres have been little more than database platforms that incorporated some measure of workflow management to facilitate problem resolution. In nearly one-third of cases, according to analyst firm Ovum in its November 1997 report *Ovum Evaluates: Help Desk and Customer Service Systems*, companies developed call centres in-house due to the perception that commercial packages were not flexible enough to fit their business requirements.

In recent years, the support market has begun to differentiate into three distinct markets: internal help desks, customer relationship management, and business support. Because many companies see customer support as a more profitable area for investment than the other two, call centre companies have dived into that market with products designed to maximise the value of ongoing customer relationships. However, as companies have begun to adopt SLM strategies — which focus on prioritising administrative resources to maximise productivity — vendors have, in recent years, renewed their focus on business support, which is poised to become a major part of an overall support market that Ovum expects will grow from $US1.4 billion in 1997 to $US6.5 billion by 2002. In the Asia-Pacific region alone, Ovum forecasts growth from $US80 million in 1997 to $US420 million five years later.

Recognising that resource management and problem resolution are critical to SLM, help desk vendors such as Vantive and Remedy have for years maintained partnerships with vendors like Hewlett-Packard and Cabletron, tightly integrating their call centre functionality with those companies' enterprise and network management offerings. By combining two previously distinct product ranges, vendors could complement their technology-oriented enterprise management platforms with comprehensive problem management capabilities built around business and end-user requirements.

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increasingly critical for companies, several major enterprise management vendors have taken this trend a step further by building comprehensive call centre capabilities into their enterprise management platforms. Last February, Computer Associates revamped its Unicenter management platform with new help desk capabilities, while in April Hewlett-Packard purchased Dutch business support vendor Prolin, whose IT Service Manager already included tight hooks into HP's OpenView management system. Not one to be left behind, last December IBM subsidiary Tivoli shelled out $US200 million to acquire internal call centre specialist Software Artistry.

According to Ali al-Tarafi, Asia-Pacific marketing manager for HP's OpenView Software Division, the Prolin acquisition was a natural fit for OpenView. "HP has always been strong in collecting data and managing individual network resources," he said. "However, that type of information is meaningless to judging the performance of a particular service; one service could be sharing network resources with a dozen others. This means it's much better that you offer network information based on how companies want the help desk to run. Using Prolin, we can collect all this information from the various OpenView products, but they will all report to the business based on the underlying information as to *how* the service levels are being achieved. This consolidated service desk now becomes the pinnacle of the managed network."

Tightening the hooks between call centre applications and enterprise management platforms will give support staff access to a wealth of system information that can dramatically speed problem resolution. For example, if a user is complaining about sluggish Windows 95 performance, support staff could query an enterprise inventory system to see if the user's PC still has just 8M of RAM. If this were the case, the support person could instantly generate a work order to upgrade the system.

Despite moves by arch-rivals IBM/Tivoli, CA and HP, the other major network management player Cabletron has no plans to acquire similar call centre technology for its Spectrum platform, preferring instead to continue its relationships with help desk providers such as Remedy. "We see a lot more strength in bringing specialist partners together rather than trying to have a one-stop shop," said Cabletron Spectrum product manager for Australasia, Stephen Bird.

However vendors implement internal support systems, it is clear that they will become increasingly important components of enterprise management architectures. Noting that one out of four call centre product sales will replace an existing system, the Ovum report said that business management capabilities will appeal to the growing number of companies realising that detailed asset management can facilitate the quick response necessary for effective SLM. "Support is provided in a context," writes Ovum in a white paper based on the help desk report. "It is no longer enough just to store and manage calls. Support system software must also aid the resolution of problems and contribute to the management not just of the support organisation, but also of the organisation as a whole."■

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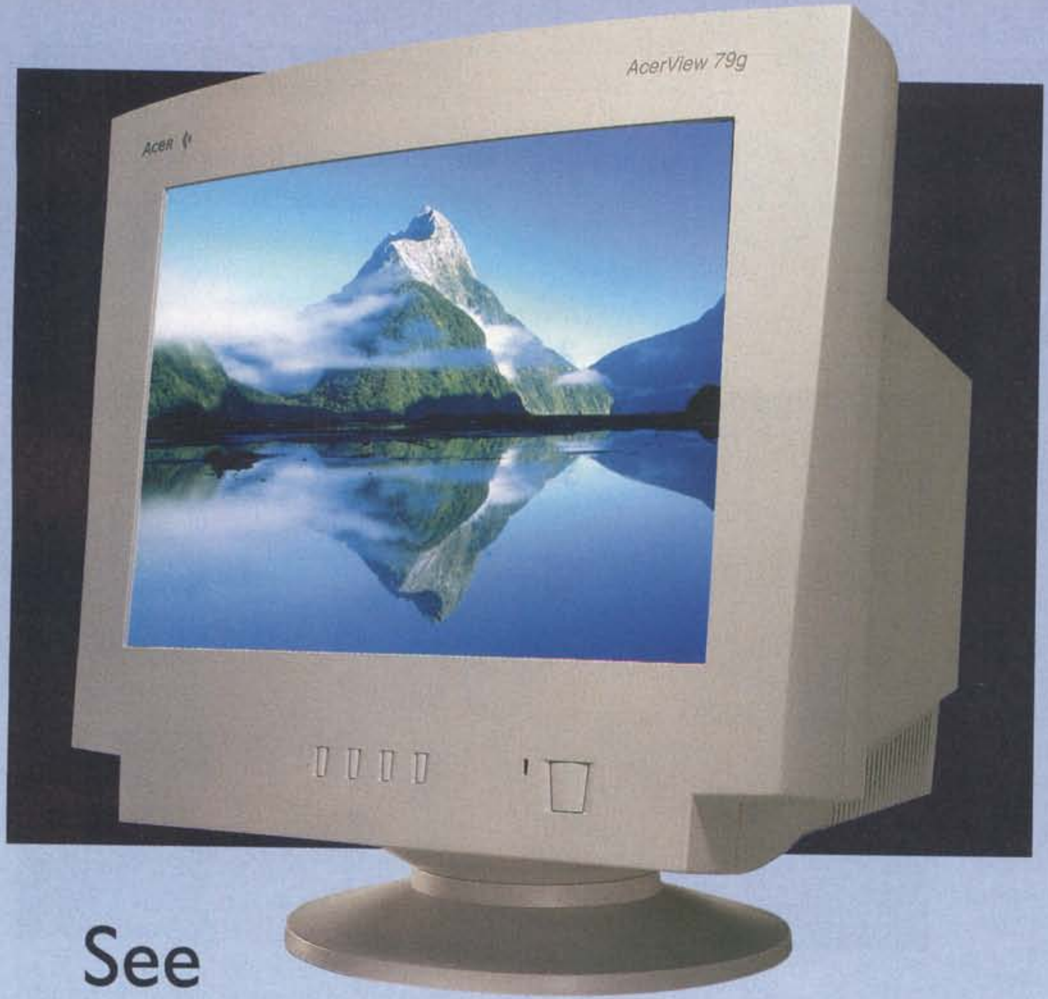

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What happens when the sage on the stage becomes the guide on the side? **By Helen Dancer**

Out of control

The classroom of the past had a teacher and a chalkboard up the front, and interaction meant the teacher writing on the chalkboard and the students copying the notes down in their books. There was a definite air of anticipated knowledge transfer about the process — I'm the one who knows, and I'm the one who's going to pass the knowledge on.

The classroom of tomorrow, while as yet still nebulous in form, starts now, and looks a whole lot different. While every school in Australia is coming to terms with the use of computer and communications technology, whether to take the Internet plunge, and whether to be an information publisher or just a consumer, the most fundamental shift that's taking place is not a technological one, but one of attitude.

It's not simply that, realistically speaking, the average six-year-old is as or more comfortable with technology than the average experienced teacher, which makes for an interesting classroom dynamic, but also the fact that the computer in a sense replaces the teacher as the source.

It's a potentially confronting concept, a teacher out of control in the classroom.

In reality, of course, it's a totally different story if well implemented. Relinquishing traditional roles makes for a much more rounded learning experience and introduces a new concept: that of co-operative learning.

According to ACOT coordinator David Allibon, in the two years since Apollo Parkways became the first Australian School to join the Apple Classrooms of Tomorrow program (ACOT), the only constant has been change. Far from implementing a new learning methodology and settling into it, he said, teachers have found that every new class and every new term brings new ways of doing things, and joyfully when you relinquish traditional roles, teachers have the opportunity to learn things from the kids.

"They have to be open to it, and that's sometimes hard for them, but in the end, it reinforces the cooperative learning process, so they become great role models for the children."

An interesting facet of the school's methodology is that if someone discovers a new way of doing something, a shortcut or a new piece of knowledge, they are encouraged to stop the whole class and demonstrate. It's not only a good way of sharing knowledge, it's also valuable in reinforcing the child's self-esteem, and reinforcing the knowledge in their own head.

Learning to regard the teacher as a project leader rather than the 'sage on the stage' also encourages children's research skills, according to Apollo Parkways deputy principal Delys Murray. When there's not just one source of information — the teacher — there's the increased awareness of the need to validate, or look further. The teacher's job, in effect, becomes that of helping the students figure out what it is they don't know, and how to go about finding that information.

As well as the change in the teacher-to-kid relationship, cooperative learning also induces an interesting change in the kid-to-kid dynamic, according to Sue Hawthorn, a long-time teacher at the school. "Working collaboratively requires cooperative skills, so that becomes part of what we have to teach as well," she said. "We have to discuss what sort of voices we might need to use to get other members of the group to cooperate or participate. For example, is yelling at someone a good way of getting them to help you or show you something you need to know? Clearly not." Thus, not shouting in class becomes an issue, not of discipline, but of achieving an outcome.

Working in groups, the children assign roles within the group based on what particular skills and interests different members have, and learn the art of reporting back, so that the project comes together.

Project work is another key difference in the ACOT methodology, because learning is structured into projects which are composites of various curriculum strategies, rolled into one. A project on Early Explorers going on at Apollo Parkways, for example, took in units of history, geography, climate, Net-based research, craft (model making) desktop publishing (including using a digital camera) and writing and presentation. The children are encouraged to work a first draft on paper and then edit their work when they type it in.

And in an environment where copying swathes of information out of the good old encyclopedia is easier than ever before, there's the pressing need to add respect for intellectual property and copyright to the curriculum. Hawthorn said the Apollo Parkways strategy for learning such respect is based on a concept called 'skinny notes'.

The children sit down with their source book and a piece of paper divided into columns, wide enough for one or two words. They then read the source material and write down the keywords only, from the source, and then recreate the information in their own words when they close the book.

Yes, it's an education revolution, but it's far from being out of control.■

WAH

Working from home is becoming a popular option, whether by necessity or by choice. **By Selina Mitchell**

In our office, telecommuting happens so frequently that we have created our own acronym. WAH (working at home) offers flexibility to staff, as well as quiet, uninterrupted work time. None of us, however, spends all our time at home — isolation can become a problem for both the worker and the employer.

While writing is often said to be the perfect teleworking occupation (and that is why telework is written about so much), it appears that Australians are beginning to take up the practice in large numbers.

Telecommuting is more readily accepted and practised in Australia than in other technologically advanced countries such as Singapore, Hong Kong and Taiwan. A recent Symantec survey on the subject has revealed that more than a quarter of the Australian population already teleworks to some extent, with 26% of working adults (18 to 55-year-olds) using a computer at home or elsewhere, away from an office, for work purposes.

The survey distinguished three types of telecommuters: full-time telecommuters working from home; mobile telecommuters working on the road, travelling or in meetings; and part-time telecommuters who work mainly in an office, but work from home after hours at least once a week.

The survey found that full-time telecommuters are still a minority: the majority (77%) are part-time telecommuters, 12% work from home full time, and another 11% were classed as mobile workers.

Women were under-represented among the mobile and part-time telecommuters (who tended to be sales and customer service people for the former group, and professionals for the latter). However, full-time telecommuters were identified as predominantly self-employed females working from home in the areas of customer service and support.

Symantec promotes the use of telework to its staff, said CEO Gordon Eubanks (pictured), who suggested as many as 60% of the company's employees spend some time working from home. In many companies a complicated program is set in place to choose those staff members who have the right personality and job description to be able to work from home, but Symantec sees it differently, said Eubanks.

"We just assume people work hard. We are trying to give people flexibility . . . making their lives more productive and making it easier to be competitive in the business, and mostly to serve customers better."

Symantec has found that the most important technical requirements for users working from home are reliability and accessibility. "They need to have a high level of reliability that their data is going to be protected and that they can get assistance . . . You can't call a support department to help you — they can't come running down, look at the machine and fix it."

Another reason for ensuring machines at home are working reliably is to keep the staff feeling positive. "The MIS departments sometimes get very resistant and say, 'We can't open the floodgates to all this stuff.' You need to have a very robust system because if it turns out that it is a support burden and MIS turns against telecommuting, then they really can keep people from doing it."

The Symantec survey noted that employers were very accepting of telecommuting in general. On a related note, perhaps, employees said that they believed their bosses expected them to take work home at night and on weekends to finish incomplete tasks. And that has always been a problem for telecommuters: they tend to keep working for very long hours. Without the correct equipment or setup, other problems can also arise, such as lack of printing facilities, one phone line, which prohibits the use of phone and computer (many telecommuters have a mobile phone, the survey found), no backup for technical difficulties, and lack of security. In the past, the dream of telework has often been tempered by concerns about isolation and tempting distractions as well as understaffed offices with ringing phones going unanswered.

However, for those who do telework, the benefits seem to outweigh the costs. A recently released Morgan and Banks study on telework found that over 60% of those surveyed believed working from home increased their productivity, and more than half said it increased their morale.■

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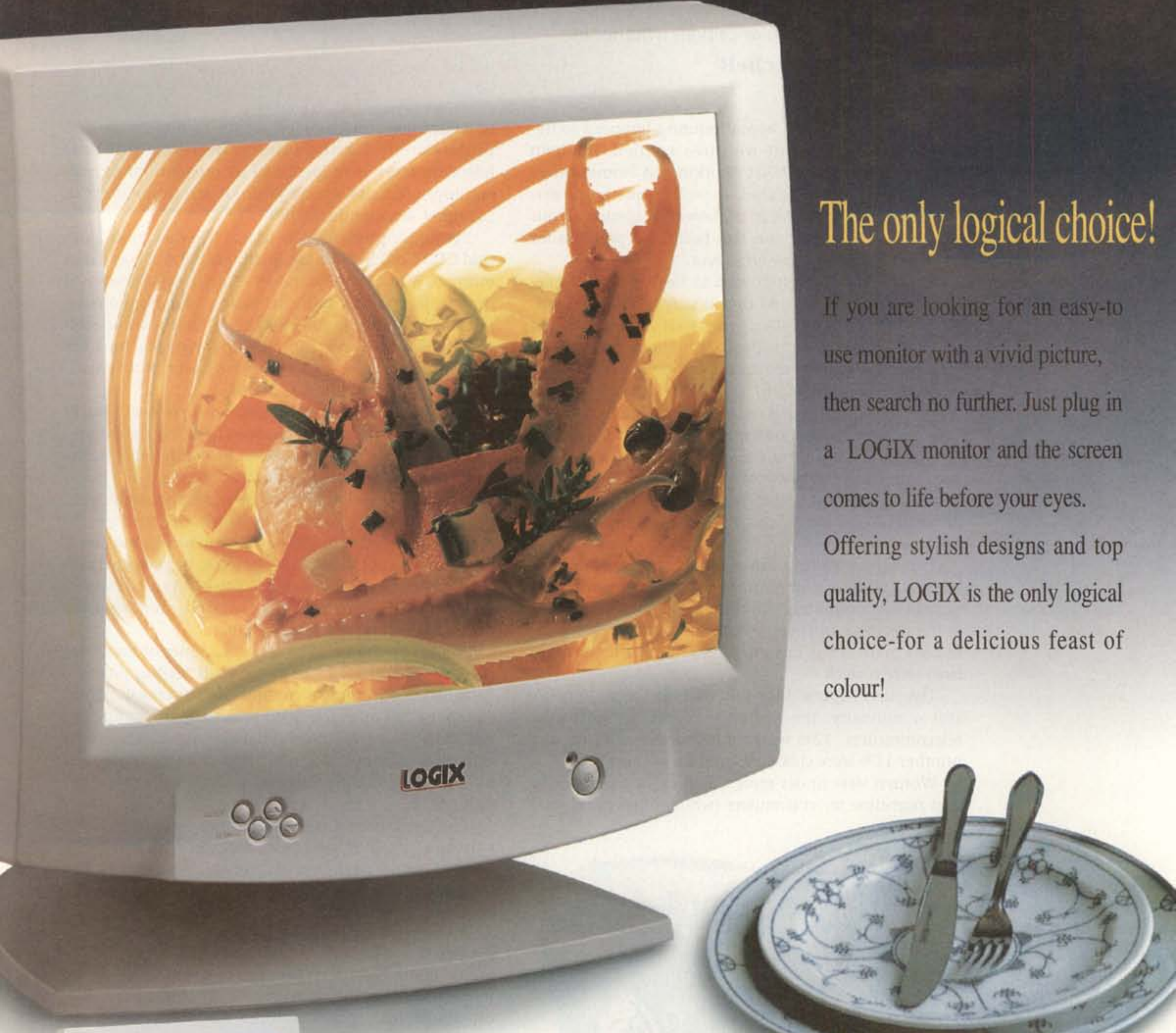

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Eubanks on fame, phones and . . . dogs

How does it feel to run a company for which the main figurehead is someone who doesn't even work there? Pretty darn good, according to Symantec's Gordon Eubanks.

By Selina Michell

Who is the CEO of Symantec? No, it's not Peter Norton, namesake for many of the utility developer's software products. Gordon Eubanks makes the decisions at the company, but prefers to be "unfamous — if that's a word", happy to do the work and receive the salary without the drawbacks that fame creates.

Peter Norton is the face of Symantec, and Eubanks sees this as an asset for the firm and also for himself. "This is a business and we are branding software; Peter represents the brand," he said. "I don't think there's a company in the world that wouldn't want a real human being that's well respected representing a product line. It's like having a celebrity endorser, but it's tighter. The problem with having a celebrity endorser is that people just don't give them credibility. They know it's money involved and fewer and fewer people spend the time understanding what they are endorsing.

"I mean, Betty Crocker who did those cookbooks, she never existed. They made her up. We have a real person that truly exists and he did write the first product and he did participate in the industry — he was one of Ziff-Davis' first columnists. He wrote newsletters before that; we have them framed. He, like, typed in these newsletters," he said, laughing.

"Every bookstore has Peter Norton books. I had one of his early books on DOS when I was a programmer, and it weighed a ton. I used this thing every day and it's all worn out. I used that book as my source when Symantec first started and we were writing our first products.

"People that work on our products have a sense that Peter has very high standards and they really take pride in that. Even though they know that Peter is not involved, they still think in terms of he's putting his name on it and they have a standard to maintain. So there's that aspect of it."

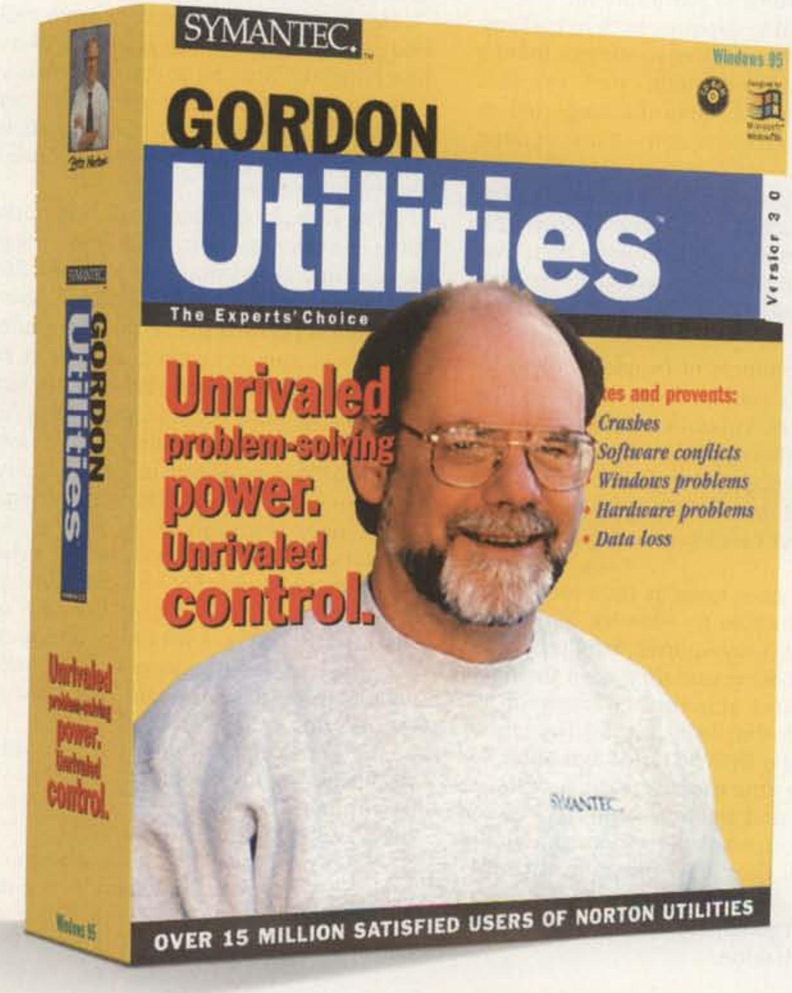
The other aspect is a bit more selfish. "I understand when Bill Gates comes to town they have guys with guns on the roof and snipers and all this protection. I have no interest in any of that. I think one of the great things about this industry is that you can actually make a lot of money. We're as well off as most of these famous movie stars, but we don't have the burden of being famous; that's such an awful thing.

"I see that with Bill [Gates]. I have known Bill for 20 years and you see that he has really changed. It's got to be a huge burden. The great thing about our industry is that we don't have to do that.

"But anyway, you've probably got more than you want on that."

It seemed Eubanks believes he gets 'carried away' on particular subjects, apologising for his interesting anecdotes regularly. A comment on the trademark yellow colour of Symantec software boxes is one example.

"Do you know why we picked that colour? I'll tell you why we picked that



colour. That's the colour that to the eye stands out at a distance. In the spectrum of light, yellow is the one that people see the best . . . Red is the colour that has the least effect on night blindness, and I happen to know this because in a submarine when it's dark outside, the control room has red light not white light, so if you had to come up to periscope depth your eyes would adjust quicker. So red is not good for packaging.

"Anyway, more than you wanted on that." He changed the subject before the 'why do you know about submarines?' question could be asked. Sorry.

Symantec is, among other things, a world-leading provider of utilities for Microsoft Office products. Eubanks describes these products as extensions to the operating system, enhancements that add value. Others say that all Symantec does is fill in the gaps that Microsoft has left, and that these holes will soon disappear.

"Some people like to say that our products fill defects. I think that's wrong. It's a focused extension.

"If you have a car and you decide to put fancy wheels on it, that's not a defect. It's a decision you make to enhance your car. People could say the automobile manufacturers would take that business away and put fancy wheels on every car but they won't because not every customer wants them, not every customer wants to pay for them."

"Some people like to say that our products fill defects. I think that's wrong. It's a focused extension. If you have a car and you decide to put fancy wheels on it, that's not a defect."

Flexibility is crucial to Eubanks, both in his company's products and the work environment that he wishes to create for himself and his staff. Telework is common at Symantec. Eubanks suggested as many as 60% of staff spend some time working from home.

"We just assume people work hard. We are trying to give people flexibility . . . One big aspect here is giving people more flexibility, making their lives more productive and making it easier to be competitive in the business, and mostly to serve customers better."

There are also instances of people working for Symantec who rarely come into the office, as they live in other US states. Eubanks said it was a wise employer that took this approach. "A lot of people would say, 'Oh, we appreciate your desire to live somewhere different, but that's a personal choice you make', versus 'Let's see what we can do to make this work'."

For those in the same town as their workplace, there are still advantages to telework, he added. "Many people are in single-parent families, or the parents are both working and they need the flexibility to be able to work at home. If a four-year-old is sick, he's sick, and what do people do? Then those people end up taking their PTO (at Symantec we don't have vacation time exactly; we have what we call Paid Time Off, and we have so much PTO for sickness and vacation, whatever). So we don't have people using up all their PTO on things like this when they could easily be working at home.

"The flexibility it gives people is really critical for them to get their job done."

Eubanks telecommutes regularly, and noted the versatility that it creates. "I am a fanatic on this work-at-home stuff. I have a full Novell network at home and frame relay," he said. "My computer is always on and I check email regularly. I would say on the weekend I would check every hour or two hours. It freaks people because they get these quick responses," he said, laughing.

However, that doesn't mean that he feels tied to work, whether at home or the office. "I look at it differently. I have total flexibility, so if I decide to do something in the morning I just don't come in to work; I do it at home. On the weekend I may get caught up, but I don't always have to drive into the office. You go into the office, and then you've left something at home . . ."

That, however, would probably not be a regular occurrence. Eubanks appears to be a man on the ball, definitely one to plan ahead. His routine for dealing with the complicated mobile phone differences around the world is but one example.

"I have with me on this trip three cellular phones. I have my US phone — of course, I need that for when I'm driving to the airport and back, and I'll be in Santa Monica for a day when I get back; I've got my Japanese phone, which I need for Japan; and I have my GSM phone, which can be used everywhere in Europe, and almost everywhere in Africa and Asia-Pacific."

He strives to be prepared. "I am a really organised person. I pack two days ahead. I have the airline bags, the little bags you get when you travel first class. British Air have these bags that are perfect. So I have an Australia bag, a Japan bag, and a Europe bag, and I keep everything [I need for those places] in each one.

"I've already got the Japan bag packed now. I put a few yen notes in it, some coins, the phone, the charger and everything." He laughed. "On my last trip to Europe I forgot my US phone. So on the way back I didn't have a phone for 45 minutes!"

For someone concerned about not being connected for 45 minutes, Eubanks is surprisingly relaxed. The head of a company with annual revenues close to $US450 million and employing about 2,000 staff, he breaks into laughter readily and talks freely on many topics, including his dog.

Security is tough at Symantec, explained Eubanks. "They won't even let me bring the dog in. We have a rule that you can't bring dogs into the Cupertino building. It became a problem when we had a guy who kept a dog chained up out front. It was a golden Lab. He moaned and people came out and said this poor dog is out there crying . . ."

But some rules are meant to be broken. "On the weekends — I have a golden retriever — I bring her in with me. They tell me 'You're not allowed' and I say 'I know that' and keep walking."

So, he does take advantage of some of the perks of being a CEO after all. Even if it doesn't involve having his name plastered on a software box, or on his own books making predictions for the future.■

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Is Windows 98 the next key advance in operating systems, or just a stopgap until Microsoft can gather its development forces behind Windows NT? APC *checks out the new features planned for 98, and looks at Microsoft's operating system plans for the future.* **By Angus Kidman**

Windows 98: Is there a

For Microsoft's desktop operating systems, it has been a long time between drinks. Since the debut of Windows 95 in August 1995, there has been a steady stream of point upgrades and service releases, but none deemed worthy of a change in nomenclature. That will change when Windows 98 debuts later this year.

The irony is that, despite the name change, Windows 98 does not represent a major change in operating system functionality. It pales in significance when compared to the leap from Windows 3.1 to Windows 95, or from DOS to Windows 3.0. In particular, users who have already installed Internet Explorer 4.0 (IE4) may be hard-pressed to spot the difference if they move to Windows 98.

It is widely accepted that one of the reasons Microsoft is making a push behind Windows 98 is that its plans for releasing Windows NT have been delayed by the inherent complexities of developing the latter. As recently as the end of last year, Microsoft hoped to debut Windows NT 5.0 in the middle of this year, which would have made Windows 98 a mere blip on the radar, the bulk of Microsoft's time and attention being devoted to NT.

However, with NT 5.0 now expected to be delayed until at least the end of the year, Microsoft needed to be able to offer an interim upgrade path to users confused by the plethora of options they were being promised in the near future. At the same time, Microsoft doesn't want to cannibalise its potential NT market, or disenfranchise users by releasing too many products too quickly.

For these reasons, it's important to examine Windows 98 within the context of Microsoft's long-term plans for NT. (For a detailed look at where NT needs to grow in order to become Microsoft's primary operating system, see 'Windows NT: One OS fits all?' on page 76.)

What to expect

Microsoft has long acknowledged that the centrepiece of Windows 98 is the integration of the Internet Explorer browser with the operating system, and this feature has been included in betas of the product since July 1997. Users of IE4 have also had access to the same basic features since that product was released in October last year. As well as bringing an integrated browsing and email tool into the operating system itself, it makes various cosmetic changes to the operating system, although the majority of these fall into the category of 'cute' rather than 'productivity enhancing'. Users will have the option of switching off the IE-based interface in favour of the current Windows 95 interface, although the OS is unlikely to ship in the latter form. The inclusion of IE also means that Windows 98 has a native Java Virtual Machine (JVM), making it a useful environment for running Java applications.

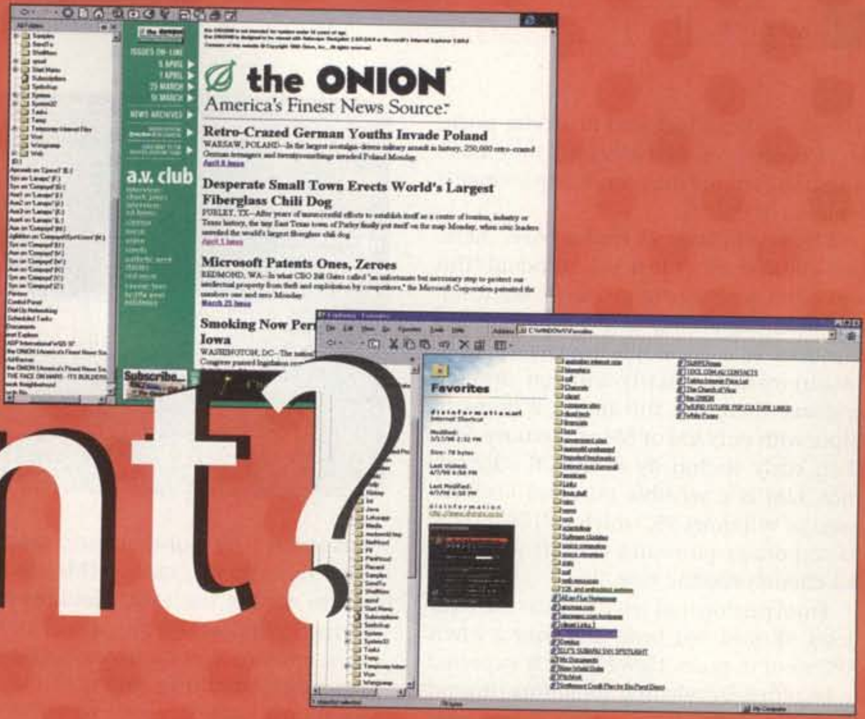
One of the less pleasant consequences of the IE integration is that it can make running products which offer similar functionality — especially browsers — a more difficult task. Several OEMs and users have reported difficulty in running Netscape Navigator alongside IE4, a problem borne out by *APC* staff's own experiences. Quite aside from the ethical and competitive issues involved, this raises real practical problems for Web site developers who need to test their sites under the two dominant browsers in the market.

IE integration is also used for Windows Update, a feature which allows users to automatically replace components on their system with the latest versions direct from Microsoft's Web site. For users keen to stay on the cutting edge, this is a useful addition, although corporates who wish to maintain some semblance of order will doubtless seek to disable this feature. (Windows 98 also includes tools to automate the distribution of the OS to multiple Windows clients.)

Windows 98 incorporates the various bug fixes and service packs which have been released for Windows 95, making it (at least theoretically) a more stable proposition than its sibling. Particularly notable is the native incorporation of FAT32 disk partitioning (FAT16 will still be supported if you prefer it). Other key additions include enhanced system optimisation, disk management and power management tools, and support for a number of input/output technologies (such as FireWire and AGP) which were not in commercial release when Windows 98 debuted. Another interesting new feature is support for television viewing within Windows, although how this will be localised in different markets isn't yet clear (early versions have only worked with the US NTSC standard, while Australia and most of Europe work with the rival PAL standard).

Compared to Windows 95 itself, which debuted a native 32-bit operating system, long filenames, an entirely different interface, TCP/IP support, the ill-fated Microsoft Network, uninstallation options, and the ability to support multiple configurations, these changes are relatively small beer, especially since many of

point?



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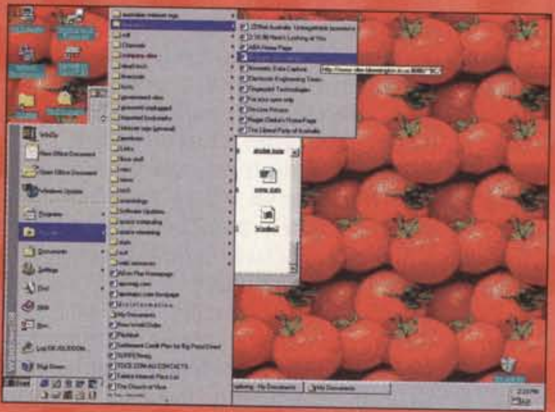
Is it a file manager or a browser? One of the much-touted features of Windows 98 is the ability for users to access and manage the content of local hard drives, network drives or the Internet from a single window. Unfortunately, this integration is nothing more than a slightly enhanced version of the IE4 desktop model pasted across the top of Windows 95, and fails completely to take advantage of COM's underlying capabilities. Open a Word file in the browser, and instead of just the toolbars changing, the entire Word application boots up.



Just as was the case with IE4, installing Windows 98 doesn't mean you have to give up the standard Windows 95 desktop. While regular Web users may find Windows 98's single-click desktop compelling, much of the same functionality can be obtained simply by downloading and installing IE4, which has the added bonus of being available free. Corporate and business users, as well as those with less than state-of-the-art machines, might want to bypass single-click desktops and IE4 altogether, or at least until they become faster and more stable.

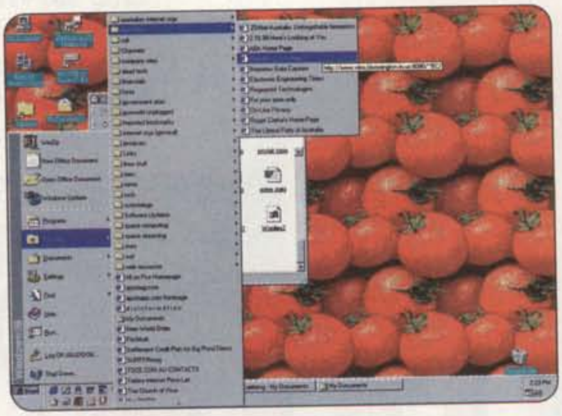
them have been included in service packs for Windows 95. Nonetheless, they have seen a shift in the minimum requirements for users of the OS.

While Windows 95 had a basic memory requirement of just 4M (although this was often unusable in practice), Microsoft has been suggesting 16M of memory for Windows 98 users. While this is a standard requirement for newly-shipped desktop systems, there are still many systems in place with only 4M or 8M of memory. Further, early testing by *APC* staff suggests that 32M is a sensible minimal level for users of Windows 98, which will be a blow to corporates planning to shift Windows 3.1 clients onto the new OS.

Final pricing and release dates for Windows 98 had not been confirmed when *APC* went to press. However, it is expected to be officially released sometime around the middle of the year, with a late June release considered likely. One wild card in the release plans is the ongoing court battle between Microsoft and the US Department of Justice (see 'Windows versus the law', page 72). Pricing is likely to be on a similar scale to Windows 95.

OEM plans

While there may be an initial surge of Windows 98 shrinkwrap purchases by keen individuals, the impact of the OS is likely to be felt most strongly at the level of PC equipment manufacturers (often referred to as OEMs). Microsoft's quickest means of ensuring the operating system becomes a recognised part of the scene is to move its OEM customers quickly away from Windows 95 (now a near-universal offering with the effective demise of Windows 3.1 and IBM's rival OS/2) and on to Windows 98.



Restricted by tightly-bound confidentiality agreements, most OEMs are reluctant to discuss the exact details of their planned Windows 98 rollouts. That reluctance remains despite investigations into Microsoft's bundling practices last year revealing a level of resentment over existing arrangements. One set of documents tendered by the US Department of Justice showed that both Compaq and Gateway 2000 had clashed with Microsoft over its refusal to let them customise Windows installations on their machines.

Nonetheless, virtually every major desktop PC manufacturer plans to offer the operating system as an option, and most will likely shift away entirely from Windows 95 by the end of the year. (One factor which might slow down that shift is the trend towards sub-$US1,000 PCs, which tend to have minimal memory and hard drive space, although memory prices have fallen so far that these are not a major determinant of system cost.) Already some vendors are planning to include free Windows 98 upgrade coupons with machines released in the second quarter of the year.

Long term, Microsoft would obviously be equally content to see vendors shipping Windows NT on desktops. It's worth remembering, however, that Windows NT is currently only a minor part of the desktop PC preinstallation market. Digital estimates that in Australia, for instance, more than 80% of its desktop systems ship with Windows 95, and only 20% with Windows NT. Since it caters almost exclusively to corporate users, Digital's NT figures are probably higher than the industry average, suggesting that the role of the low-end 32-bit system (be it 95 or 98) should not be underestimated in the current market.

The Windows NT factor

Despite that, many elements of the design reinforce the notion that Microsoft is creating Windows 98 with one eye firmly on an NT-packed future. The most notable is the creation of a unified driver model across NT and 98, eliminating the need for hardware developers to create multiple drivers for the Windows platform. While the class of drivers this will apply to is restricted to a subset — including USB devices and audio and video capture systems — in Windows 98, it provides a relatively clean upgrade path for Microsoft to migrate users onto NT in the future.

Most Microsoft officials acknowledge that Windows 98 will be the last major operating system from the company with a heavy emphasis on backward compatibility with 16-bit applications. While this will undoubtedly simplify Microsoft's own development task enormously — ensuring interoperability with highly unstructured DOS applications is no mean feat — it will

Should you or shouldn't you?

You should consider Windows 98 if:

- it is already preinstalled on a PC you are purchasing
- you have application stability problems and you haven't installed any service packs
- you frequently add new peripherals to your PC
- you want to take advantage of the new power management capabilities (and your PC is capable of doing so)
- you regularly switch devices between NT and 95 systems

You should stick with Windows 95 if:

- your PC has less than 16M of memory
- you're comfortable with Windows Explorer, or you actively dislike Web-based browsing of local files
- your IT department isn't ready to support the new OS
- you've devoted considerable time to making your existing system stable
- you make extensive use of Netscape Navigator

You should consider Windows NT if:

- you are working in a largely networked corporate environment
- you have no need whatsoever for 16-bit or DOS applications
- you have concerns about application stability or security under Windows 9x
- having 64M of memory on each desktop isn't a problem

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be interesting to see the impact on sales. Windows 95, for instance, made heavy play of its backward-compatibility features, and the inability to simply open and save files from Word 95 in Word 97 dampened enthusiasm for the latter product among many users. Compatibility, it seems, is still a key issue for many users.

So does it matter?

Although Microsoft officials have tended to downplay the importance of Windows 98, the fact that it has been running extended promotions for the new OS in US cinemas suggests that it does want the new OS recognised at consumer level. If Microsoft chooses to make Windows 98 its preferred OS for the mass market, and gets backing from just a handful of major PC vendors, then competitive pressures will force most other manufacturers to follow suit.

However, migrating the existing user base will be a different story. Windows 95 received a much stronger promotional push than that planned for 98, and yet despite this Microsoft estimates there are still 200 million Windows 3.1 clients in use, and a notable, if shrinking, base clinging to the even older DOS.

As 98 is a less compelling upgrade for many users, the base of 95 users is likely to remain strong, especially in the change-resistant corporate environment. Technologically, the arguments for and against migrating are not particularly pressing (see table 'Should you or shouldn't you?' for more details), and Microsoft will not be able to encourage vendors to write 98-specific applications in the same manner as it did with Windows 95.

The ultimate significance of Windows 98 may in fact lie in its contribution to perceptions of Microsoft and how it conducts business. With many of its existing contracts under close scrutiny, Microsoft will have to exercise extra care in drafting distribution agreements, especially with OEMs.

Strong consumer acceptance of the integrated OS will give Microsoft an extra card to play as it faces legal challenges over the legitimacy of its bundling tactics from its business rivals and (more significantly) from regulatory agencies the world over. Conversely, a lukewarm acceptance could be cited by the company as evidence that it does not control the desktop OS market. Either way, however, the agreements which Microsoft seals in its efforts to promote and distribute Windows 98 may ultimately end up deciding the fate of the company.

Key new features in Win 98

- **Browser integration with desktop OS functions**
- **Improved system optimisation tools**
- **USB support**
- **FireWire support**
- **AGP support**
- **Multiple monitor support**
- **Improved power management**
- **Television tuner**
- **Native JVM**

Casting judgement

Windows versus the law

Although three years seems rather a long time to build a point upgrade, most of the delays in the release of Windows 98 can be attributed to the normal problems which plague software developers: unexpected bugs, sudden changes in direction, and the need to test software on a wide variety of platforms and applications. A particular problem for Windows 98 has been the need to develop a migration toolkit for Windows 3.1 users, who inevitably are using older and more basic hardware configurations.

Speculation continues, however, as to whether Windows 98 will also be delayed by a purely non-technical problem: a lawsuit from the US Department of Justice (DOJ), which has been pursuing damages against Microsoft for what it claims are anticompetitive licensing practices in the distribution of Windows 95 to PC manufacturers.

Although swathed in legal complexities, the essence of that case centres on Microsoft requiring PC manufacturers to license Internet Explorer on all Windows 95 machines. Microsoft claims this is essential, since IE is an integral part of Windows, while the DOJ counters that Microsoft's distribution of IE as a separate product and its availability on non-Windows platforms makes nonsense of that claim. The DOJ wants a version of Windows made available to OEMs that does not include IE's browser functionality, in order to ensure consumers have a realistic choice of browser.

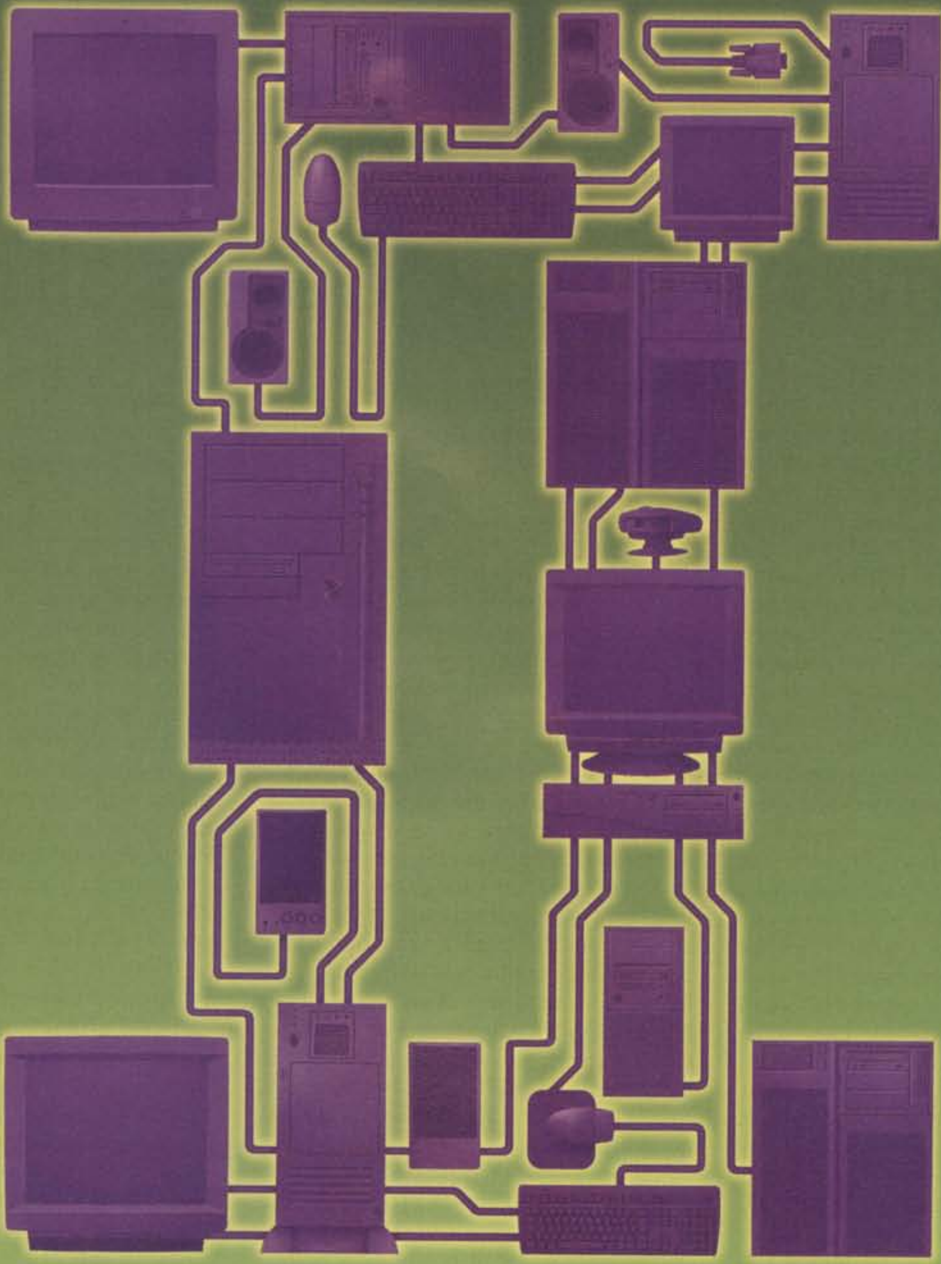
The DOJ has confirmed that it is also investigating Windows 98, and some observers believe that it may attempt to have the release of the software blocked. At the time of going to press, the DOJ was still concentrating its efforts on the Windows 95 case, although a decision should have been made on this case by the time you read this. See **apcmag.com**'s news section for the most recent reports.

From a practical point of view, the 95-centric approach makes sense. US legal experts have pointed out that the direct case against Microsoft is strongest in the case of Windows 95, since it signed a consent decree with the DOJ in 1995 in which it undertook not to make licensing of Windows 95 conditional on the licensing of other products. If the court accepts that IE is in fact a separate product, then the case against Microsoft is fairly clear.

To establish that including the browser as an integral part of the OS — as with Windows 98 — was anticompetitive would require a much more complex set of evidence, however, and by the time all the relevant legal argument was completed, Microsoft could easily have shifted its product plans.

Nonetheless, if the DOJ does win its Windows 95 case, it is likely to attempt to impose similar conditions on Windows 98. Microsoft's response to that is likely to be an appeal, leaving the final outcome of the Windows legal wars some years away.

Angus Kidman



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Microsoft is plugging NT as an operating system for all seasons. But there are still a number of gaps that need filling.

Windows NT: One OS fits all?

Windows 98 and innumerable product delays notwithstanding, Microsoft has made no secret of the fact that in the long term it intends Windows NT to be the basic product which it sells to practically everyone. In the grand vision, new versions of Windows NT aimed specifically at consumers will debut around 2000, possibly with some of the more memory-hungry networking and security features trimmed back, but with the core NT APIs intact. Around the same time, a high-end version of NT aimed at the mainframe market is also due for release. Windows NT Home and Windows NT Enterprise (for want of better or finalised names) will join the existing client and server releases, as well as other pieces of exotica such as Windows NT Terminal Server (see 'Hydra: WinFrame for NT 4.0', page 78), in the pantheon of NT products.

The exact timing is a subject ripe for dispute and conjecture, especially since the release date for Windows NT 5.0, a necessary precursor to most of these other plans, remains a shifting target. Current estimates suggest that NT 5.0 won't make its appearance before the end of 1998 at the absolute earliest, and many industry pundits are suggesting that most of the first half of 1999 will pass before the OS makes its formal debut. The greater those delays, the further away specialised versions of NT are likely to be. The broad question remains, however: can one operating system offer everything to everyone?

The broad answer, as even Microsoft tacitly admits, is no, and to approach some specialised markets, such as portable devices and Web TVs, Microsoft will be putting its marketing grunt behind various versions of Windows CE. Nonetheless, Microsoft's overall vision — embodied in such currently hollow concepts as Windows DNA — does tend to assume a Windows NT-centric view of the computing world.

However, a close look at the current feature set and requirements of Windows NT also suggests that quite a bit of work is required before Microsoft's 'Windows everywhere' vision shifts to 'Windows NT everywhere'. Here, we look at how well Windows NT measures up as a practical choice for home users, small business users, corporate users and enterprise-wide systems.

Home users

For home users, perhaps the most obvious benefit of Windows NT is the increased stability made available by native multithreading. While Windows 95 was a substantial improvement on Windows 3.x in this respect, it still crashes far more often than a mass-market operating system should. For users tired of inexplicable blue screens, NT might provide a welcome panacea, although the wealth of features planned for NT 5.0 may put a strain on system stability.

NT does have a number of challenges to overcome in the home market, however. Its dramatically higher system requirements will make it unappealing to users who want a new OS on their current machine. The emphasis on corporate options such as security and high-level networking may result in large amounts of hard drive space being consumed on unwanted features. Historically, NT has also lagged behind in driver support, although the adoption of a unified driver model for the 32-bit Windows family should go a long way towards overcoming that.

None of these problems is insurmountable, and indeed much of the development effort for a home version of Windows NT is likely to be dedicated to stripping away those features not deemed essential for mass-market users. That will, however, require close cooperation with applications vendors to ensure that NT Home doesn't go through the same painful teething process as Windows 95. The pricing structure will also obviously need modification to reflect the needs of single-unit buyers.

For games-oriented users, NT's reduced compatibility with older DOS-based applications is a serious drawback, given that games developers have only been developing specifically for Windows in the very recent past. While future plans for DirectX will make Windows a generally more compelling platform for that class of user, the fact that DOS survived for so long as a gaming platform — well beyond the life span of most DOS productivity applications — and the price/performance competition provided by dedicated games consoles, won't make Windows NT an especially appealing option for the dedicated gamer.

Small business users

Microsoft's first NT-specific sop to this market segment, the Small Business Server (reviewed in *APC* January, page 24), has met with mixed reactions, with many users criticising its 25-user limit and restricted database sizes. Microsoft plans to rejig the product in the next few months to answer those criticisms. The straightforward management tools already offered in Windows NT have given it a foothold in the small business market, especially since the release of NT 4.0, which included the Windows 95 offering.

If Microsoft prices the standard Windows NT offering more attractively, it could push itself further into the small business market with minimal pain. Widespread support would likely depend on easier availability of Windows NT preinstalled on OEM machines, however, since small businesses are unlikely to want to devote large amounts of time to client installation and maintenance.

It will also face continued competition from other companies, given that less than 30% of small businesses in Australia currently have IT implementations. Novell, which has historically been the strongest player in small business, will provide particularly fierce competition; it is also offering a small business-specific version of NetWare, and can point to its much longer heritage in the directory and management space.

Corporate users

The corporate niche is NT's natural home, and most of the developmental effort on the product to date has targeted the needs of this market. Microsoft hopes to answer the most pressing corporate criticism of NT — the lack of true directory-based management tools — with the Active Directory feature of NT 5.0, although this too has met with mixed reactions (see page 80). It also hopes to enhance the OS's multiprocessor performance, and add improved support for clustering.

Microsoft's major challenge will be to

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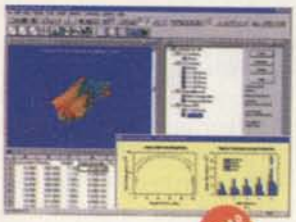

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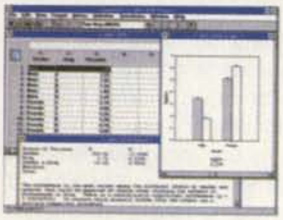

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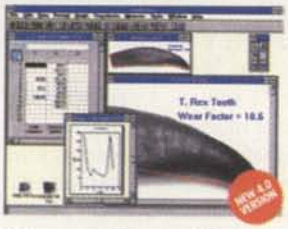

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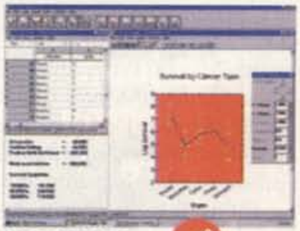

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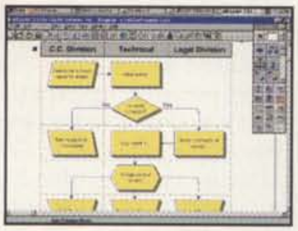

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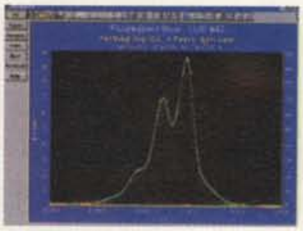

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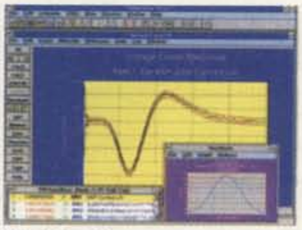

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stave off its existing competitors. It will draw even with Novell in one respect with the release of Active Directory, but Novell is likely to counter with continued promotion of its NT/NetWare integration tools and BorderManager suite, and it still enjoys the larger part of the world NOS market. It also faces competition from the relatively new market for PC-based thin clients. The Windows Terminal Server (see page ^) will no doubt claim a good portion of that market, but the company's continued reluctance to promote Java as a cross-platform development tool may cost it some corporate accounts, despite its acknowledged skills in delivering speedy Java compilation.

One corporate market where Windows NT has established a solid, if somewhat surprising, beachhead, is in notebooks. PC manufacturers report an increased interest in NT bundling from notebook buyers, reflecting both the incorporation of some of 95's mobile technologies and the increased importance of stable networking for notebook users.

Enterprise-wide systems

Microsoft's key problem in the enterprise-wide systems market is one of credibility rather than functionality. Indeed, its ubiquity in the desktop space can be said to work against it in the enterprise. Because virtually anyone who has ever touched a PC is likely to have increased operating system instability, the reaction to suggestions that Windows could be the backbone for an entire organisation is likely to be tempered, to say the least.

Microsoft's strategy to overcome the perceptual problem has been to partner itself with companies already well established in enterprise computing, notably Digital and Hewlett-Packard. It also plans to develop a specific 64-bit implementation of Windows NT 5.0 for enterprise systems, adding in features such as hierarchical storage management and full disaster recovery, which are enterprise staples but new ground for Microsoft.

Patience will be a virtue in this market. Microsoft was forced to endure extended market indifference to early versions of Windows NT before its current sales success story began. A similar experience is likely to face attempts to graft NT into the enterprise space, where reliability is the single most important factor. Development cycles — already stretched across several years for most existing Microsoft products — will also probably extend further for products in this sector.

Angus Kidman

Multiuser NT

Hydra: WinFrame for NT 4.0

While NT 5.0 still remains a distant speck on Microsoft's schedule, it has managed a major upgrade for NT already this year. Windows NT Multi Terminal Server, codenamed 'Hydra' during development and currently in Beta 2, is essentially a set of extensions to Windows NT 4.0 (later to be integrated into 5.0) which enables multiple clients to run applications on the server as though they were running them on their desktop PC.

Anybody familiar with Citrix WinFrame, or the multiuser features of X-Windows for that matter, will probably know the story: applications are executed on the server and only the visible and auditory results are transmitted to clients over the network. Because it requires minimal processing power at the client end, very cheap clients can be used, but any application that can be run on the server can be used by the client. Obviously, the requirements of the server are hefty, and scale considerably depending on the number of users. X-Windows Terminals and Citrix WinFrame clients have been known to be very thin — a 286 can act as a WinFrame client, for instance (albeit only in 16 colours). Network bandwidth requirements have also been shown to be minimal.

The goal of these multiuser environments is to simplify management of application access and data storage and reduce the total cost of ownership. For Microsoft, it also represents the next step in what it calls the 'Windows on everything' strategy.

So what makes Hydra different to Citrix WinFrame, which has been around for a few years now? The answer is very little, except that Microsoft has made it very difficult for Citrix to continue to evolve WinFrame. Citrix's strategy was to license Windows NT and then build extensions to it that transform it into a multiuser operating system capable of executing programs for and delivering graphics to a number of clients. These extensions to the OS were called MultiWin, and the graphic delivery protocol was called Intelligent/Independant Console Architecture (ICA).

Microsoft, however, withheld the licence for Windows NT 4.0 and later versions of the operating system from Citrix, meaning that Citrix users were stuck with running NT 3.51 applications forever.

Microsoft then licensed MultiWin from Citrix, but instead of using Citrix's ICA, decided to go with its own presentation service, called T.Share/T.120, similar to that used by its own NetShow product, and based on the ITU's T.120 conferencing protocol. The combination of the licensed MultiWin and Microsoft's T.Share protocol forms the basis of what is now known as Windows Terminal Server.

So the differences between WinFrame and Terminal Server are essentially this: Terminal Server will continue to evolve with Windows, and will be initially capable of delivering NT 4.0 applications to users; and the protocol used to deliver display and audio packets to the clients will be different (requiring different client software).

It is unclear as to the range of clients that will be supported by Terminal Server, although it is certain that clients will exist for all sorts of Microsoft operating systems, from MS-DOS, through Windows 3.11, 95 and NT, possibly even including Windows CE. Other platforms are less certain, but Microsoft lists X-Terminals, Apple Macintoshes, NCs (via Java) and Unix desktops in its client plans (although the last will only be supported through third-party development).

Several companies, including Wyse and Boundless Technologies, who already produce Windows Terminals based on the Citrix product, have already committed to producing clients for Windows Terminal Server — and both are expecting to offer hybrid products which support ICA and T.Share.

In the washup, what Terminal Server has going for it is the availability of future versions of Windows (Citrix is now working on its pICAsso project, which provides ICA extensibility to Microsoft's Terminal Server, along with extra management tools) plus the name and massive marketing powers of Microsoft.

Nathan Taylor

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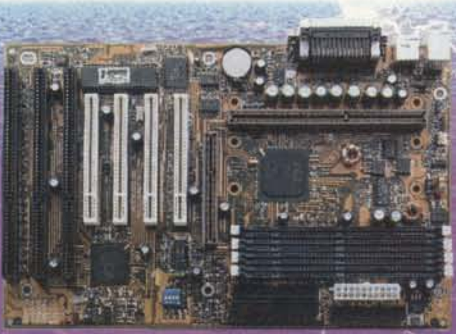

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NT 5.0 looks to the directory

Version 5.0 of Microsoft's Windows NT Server network operating system (NOS) is a major part of the company's osmosis into the big money world of corporate computing. The migration from LAN Manager to NT 3.51 to NT 4.0 has seen Microsoft increasingly gain the confidence of corporate users, and it now wants to cash in on that mind-share.

A recurring criticism, however, has been the product's lack of an enterprise-strength directory service. NT's domain-based directory service has typically been considered not as scalable as Novell's hierarchical X.500-based NetWare Directory Service (NDS). According to Microsoft, that will change with NT 5 and its Active Directory component.

"Assume they're [NT 4.0 and Active Directory] unrelated in nature," said Terry Clancy, Microsoft Australia's business systems product manager. "The only way in which they're really related is that our migration tools will migrate what's in a domain in NT 4.0 into what's called a domain in NT 5.0. But from an architectural point of view assume they're totally dissimilar . . . the strategy is really to provide the best of DNS and the best of X.500."

Novell has traditionally been king of directory services, although a mixture of self-destruction and Microsoft getting its act together has recently eroded its dominant market share.

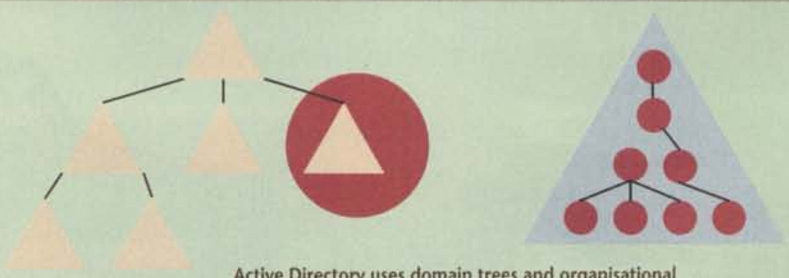
Despite all that, NDS (Novell Directory Services) continues to be a strong differentiator of the two NOSes. Novell has now released NDS for NT, which allows administration of all users, both NT and NetWare.

Not surprisingly, Novell asserts that Active Directory will retain much of the existing NT Server 4.0 technology and limitations and essentially will be a first-generation product. Clancy said Active Directory will be a fourth-generation product, and points to NT's value as a general-purpose operating system. Basically, both companies are playing to their strengths.

Irrespective of what vendors say, users, particularly corporate ones, like to exercise caution when faced with new options.

According to John Finn, group communications manager at accounting software and services supplier Solution 6 in Sydney, NT's domain-based directory service has not placed limitations on the way he administers his existing networks.

A new architecture



Active Directory uses domain trees and organisational units to provide bottom-up tree structures.

"We have over a dozen NT servers and the domain system has not limited us yet. In the medium term there are some architectural changes we would like to make where domains may be less than a perfect solution," Finn said.

He added that Active Directory would not in itself be a compelling reason to upgrade to NT 5.0. "There may be some savings in administrative overhead that would encourage us to move. However, there is no way I would put NT 5.0 into production until at least the first service pack was released."

Another network administrator running an NT network said that if he needed directory services he'd prefer to use NDS for NT for reasons including NDS's maturity, robustness and scalability, cross-platform capabilities, and the fact that Novell applications are typically less resource hungry than Microsoft ones.

He also cited security concerns. "I can crack several non-dictionary passwords on my network inside two days. There is a patch that kind of fixes this, but it requires you to be running only NT throughout your network," he told *APC*.

Away from directories, Microsoft has a plan for NT 5.0's interaction with Windows 98, generally in terms of reduced cost of ownership, specifically in terms of software distribution. Not surprisingly, that can only be done in the Microsoft perfect world where Windows 98 and NT 5.0 are deployed using applications designed for those platforms, along with new 'templates'.

"A profile describes a user, a policy describes rules about what can and cannot happen in the operating system, and templates describe things about applications. Policies and profiles exist today in Windows," said Clancy.

"A large part of our total cost of ownership revolves around the use of IntelliMirror technology, and the use of policies, profiles and templates and IntelliMirror technology allows you to keep all your user state [user details] on the server.

"Depending on how you structure the template, that might mean copying many files down onto the client machine or it might mean copying none if they choose to run Word [for example] across the network."

So what sort of development resources will need to be deployed to Active Directory in order for it to work in existing infrastructures? Microsoft is pushing its own ADSI (Active Directory Services Interface) as a standard.

"A lot of people ask why we have ADSI when there's LDAP [Lightweight Directory Access Protocol]," said Clancy. "LDAP only has a defined C language API . . . You cannot call a C language API from any language, which means we have ADSI which can be called from Java, Visual Basic, C++, or whatever. It's a Com interface, so it's object-oriented, and it provides this directory functionality . . . The second reason is that ADSI is far richer in its functionality and supports multiple back-end directories."

Clancy added that developers need to be aware of the Windows 98 and NT 5.0 installer. "They also need to have a very clear understanding of templates, policies and profiles. Because if not, their applications may not work in a Windows 98 environment."

Steven Fear

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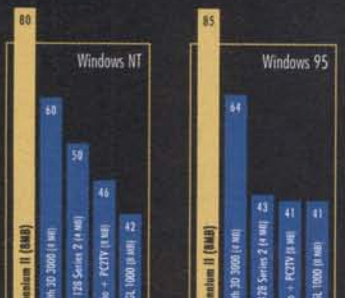

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The network's connected to the garden, the lawn's connected to the kitchen, the toaster's connected to the TV . . . APC *looks at emerging technologies in automation, entertainment and home networking, all designed to futureproof your house.*

By Simon Vandore

Your dream wired home

It's Monday morning and a pleasant voice says, "Time to wake up — the coffee is brewed and the weather is fine at 23°".

As you roll back the sheets, dim lighting comes on and you are informed of some urgent email. The lights get a little brighter as you near the kitchen, where you say the name of your favourite composer and a symphony begins. You read the messages over some damn fine coffee and a slice of preheated cherry pie.

"News," you say, and on your way to the bathroom the music fades, replaced by the latest radio headlines. Taking a temperature-controlled shower you hear a story on rising crime; but as you leave for work, motion detectors, security cameras and an alarm stand guard.

You're late home, so the house carefully uses light and sound to create the outward impression that it's inhabited. Later, after watching a personalised DVD of today's sporting highlights in surround sound, you drift off to the sounds of peaceful whale song as the lights dim.

Nothing unusual about this scenario if your surname is Gates, but what if it took place in your own home? It's already possible, but you might have some strong reasons not to even attempt it. Too expensive? Untested technologies? Only for geeks? Then let's dream a little.

Technologies for creating a truly wired home are here right now. Thanks to a growing fan base and a competitive market, prices are coming down. The sky is still the limit and the average project costs thousands of dollars, but it's now possible to get a little home automation (HA) happening for relatively little investment, to complement your home data network and entertainment systems. If implemented and integrated with proper planning, these concepts can add real value to your home.

The first thing to do is look at your needs. Do you really care about the coffee? Would you rather just get the lights working on cue, and maybe improve security? It's important to plan carefully and make your decisions futureproof — install the right wiring, lighting, security system, audio and video technologies and other appliances to create an interoperable, upgradable habitat.

Standards

Most HA systems use a dedicated set-and-forget control unit which can be told to schedule events. Often these instructions are entered via a PC, but it's rare for home automation itself to be controlled directly from a computer. The better systems potentially integrate lighting, security, curtains, home entertainment, event alarms and the like, so that pressing play on your VCR could activate your home cinema system, dim the lights, close the curtains, switch on the security in other parts of the house — and perhaps even tell the lawn sprinkler system to deliver a good soaking — letting you settle back right away and enjoy a movie.

In the US the home automation industry is booming. This early success is led by a protocol known as X-10, which has been around since the late 1970s but until recently was only for boffins. It allows communication between devices over standard household power lines (AC), meaning that lights can be given commands such as 'on', 'off' and 'dim'. Nowadays there's a company called X-10 selling relatively inexpensive home automation modules to perform all manner of tasks, and most home automation products are released with X-10 compatibility.

This is all very well, but you're unlikely to come across X-10 in Australia, despite this country's reputation for early adoption. Once you get around voltage compatibility issues, according to Sydney HA contractor David Beauchamp, the layout of our electricity grid system vastly reduces the reliability of the technology. More homes are clustered around each point on the grid, meaning it's much more likely that signals will go astray, switching the lights on and off in your angry neighbours' homes. X-10 products are also pretty scarce here, due to a dearth of interested importers/distributors.

For the moment, the solution lies in a group of home-grown technologies dominated by Clipsal's Minder and C-Bus. Clipsal and half-a-dozen competitors supply a burgeoning Australian HA industry which is still small enough for

most of the contractors to have met each other. It's a unique field, where the electrician's trade converges with IT.

C-Bus is not to be confused with CEBus, a new international standard developed by an industry group which improves on power line carrier technology by adding error checking and other advantages while still using standard household wiring. Future devices should all be CEBus compatible, but it may be a while before CEBus is widely adopted. Meanwhile, a US company named Echelon has invented LonWorks, a competing protocol designed to work over anything from power lines to fibre-optic networks.

And then there are all the other upcoming standards. Plenty of designs are under way for home computer networking via power lines (presuming you can bring yourself to connect a serial port to a power point and aren't already using X-10), such as Intelogis's Passport. Microsoft, Compaq and Intel are working on an interoperability system which uses telephone, cable, wireless and power line connections. An open standard for wireless digital communication between consumer electronic devices was proposed in March by the Home Radio Frequency Working Group (HRFWG, an industry body which again includes Microsoft, Compaq and Intel, along with IBM and a number of major communications and electronics firms). This proposed standard was dubbed the Shared Wireless Access Protocol (SWAP).

Wired home video

Display home

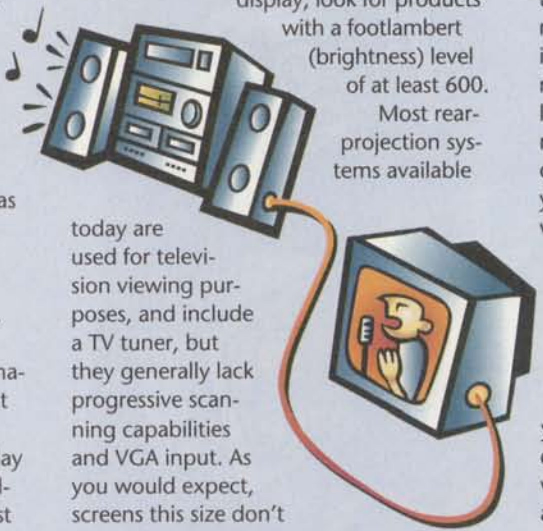
Unfortunately, now is not the easiest time to be purchasing displays for a futureproof home. The display industry is very much in a state of transition, which could make choosing the right video technology for the home a very tricky prospect. Over the next five to 15 years, a strong move away from the display and broadcast methods of the past 30 years is expected, with flat-screen displays becoming more capable, and digital television (DTV) transmission just over the horizon.

If you want the absolute best (and can afford it), plasma screens are the way to go, although at the moment only Fujitsu sells this 'display of the future' in Australia. In plasma displays, gas in a plasma state is used to react with phosphors, making the phosphors glow and provide colour. This interaction is carefully controlled by electrical charges.

Other vendors have jumped on the plasma bandwagon, notably Hitachi, Panasonic, NEC and Sony. But what's so great about plasma? For one, it's a flat-screen technology, which means a plasma display can be hung from a wall or easily embedded in one — Fujitsu's Plasmavision is just 15cm deep but has a screen size of 42in.

There are downsides to plasma screens, however. The first is the cost — a 42in plasma screen costs around $20,000. Time and competition will, of course, lower the price, but at the moment few people can afford this technology. The other problem is resolution. At these early stages of development, the maximum resolution offered on the Plasmavision is 800 by 600dpi. Panasonic's product (which is available in Japan) is capable of only 640 by 480, but Hitachi plans to launch a 24in, 1,024 by 768dpi screen later this year. These resolutions are certainly capable of handling television signals adequately, but not high-definition television or high-resolution computer images. Finally, the models available so far do not have TV tuners, instead using VGA signals (requiring a computer or other VGA source) or straight PAL/NTSC signals carried by S-Video or RCA cables. So if you want one in your home, you need a separate device to tune into television channels — a TV-tuner card for a PC or video, for instance.

Projection displays are also an option for those with plenty of money to throw around. Rear-projection televisions have been in stores for quite some time, and can offer sealed sets with staggering screen sizes — some even go as large as 80in. Using three small picture tubes to project images on the back of a plastic screen after reflecting them onto mirrors, rear-projection systems suffer from generally low luminosity levels. If purchasing a rear-projection display, look for products with a footlambert (brightness) level of at least 600. Most rear-projection systems available today are used for television viewing purposes, and include a TV tuner, but they generally lack progressive scanning capabilities and VGA input. As you would expect, screens this size don't come cheap: expect to pay between $3,000 and $20,000, depending on the size and brand, for a rear-projection system.



Another option for truly spectacular home entertainment experiences is front-projection systems, which have progressed to such a point that they can provide brightness levels sufficient to provide compelling in-home vision. Multimedia projectors are now available which are capable of SXGA (1,280 by 1,024dpi) resolutions and input, as well as PAL, SECAM and NTSC inputs, although they rarely have tuning capabilities. Again, however, multimedia projectors are not for the cash-strapped, costing up to $50,000 or more (plus extra for the screen on which it is to be projected), and obviously require space conducive to front projection (a small theatrette, for instance).

For those of us who don't have wads of cash to burn, standard (direct-view) CRTs will have to do. Direct-view CRTs are limited to about 100cm in diameter, but this can still provide a great entertainment experience. One key question is whether to purchase an interlaced screen (a TV set) or a progressive-scanned screen (a monitor). The former is cheaper and has an in-built TV tuner, but lacks the flexibility and resolution of a monitor. Consumer acceptance of PC-TV systems to date has been poor for various reasons.

Gearing up for digital TV

The bad news is that it's next to impossible at this stage to prepare for digital television. In March the Government released rules for digital television's implementation in Australia, but it is still not clear which transmission and modulation standards will be used. As a result, receivers capable of tuning in and decoding DTV signals are not available yet, and judging by the US experience, will be very expensive when they do become available. This does not mean that you'll have to throw out whatever you buy now when DTV comes online (set-top boxes will probably be available to translate between DTV and analog signals), but it will mean that you won't be able to enjoy the benefits of high-definition television (HDTV) without buying a new system costing around $8,000.

Perhaps the best way to futureproof against HDTV at this stage is to purchase a high-resolution display — one capable of displaying multiple resolutions, from standard television resolution to HDTV resolutions. Instead of purchasing a screen with an in-built TV tuner, an external television tuner should be used, from a PC or video, for instance. This way, instead of upgrading the whole screen, just the tuner can be upgraded.

Getting a 16:9 aspect ratio screen is also an option, although if you do, you will be living with large dark patches on the sides of the screen for some time. Some HDTV transmissions are planned to be broadcast at this aspect ratio, and some DVD movies also come in 16:9. When viewing these on a standard 4:3 screen, only a fraction of the screen will be used.

Of course, as with all things DTV, this may change, depending on how the standards pan out, the availability of sets and set-top conversion boxes, and the resolution of spectrum issues. Any attempts to be DTV-ready at this stage are really guesswork, and nothing more.

Nathan Taylor

Hubble Telescope

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Picture The Possibilities

The network is the house

Anyone planning a new home might be able to achieve more than someone looking to put together systems for an older building. Whether it's extra cabling in the walls or deciding to purchase compatible appliances from the beginning, building from the ground up seems like it would offer more potential advantages. But plenty can be done with an established home — wireless networking between devices is gaining ground as home owners reject the ugliness of cable trails and the expense of 'bare wall' wiring installation.

These days it might be expected that every new home built should be as futureproof as possible. But *APC* contacted several major Australian home design firms and found none of them offer any kind of home automation design options as standard. Two suggested their electricians might be able to do something if a customer wanted computer network cabling built into the walls, but otherwise any 'wired home' additions would have to be ordered separately through a private contractor. One company, Huxley Homes, was providing a special offer of the customer's choosing with every project — tiles, carpets, a dishwasher, or a lighting automation system!

Developers of high-rise apartment blocks are generally more aware of automation, but usually individual customers are the driving force. One exception is the Observatory Tower apartment block in Sydney (the old IBM office building), where architects Crone and Associates made lighting automation, high-bandwidth cable and advanced communications systems standard in every unit. A network-ready home is increasingly seen as a better investment, especially (but not exclusively) by customers who work in technology industries.

Gavin Taylor, of Intelligent Home Systems in Adelaide, compares HA adoption to the advent of ensuite bathrooms — at first they were considered a luxury, but now they're standard in practically every new home.

If cost is no object, why stop at prewiring your home? Several companies now make flat loudspeakers that can hide behind wallpaper, and flat picture frame-shaped display screens to hang on your

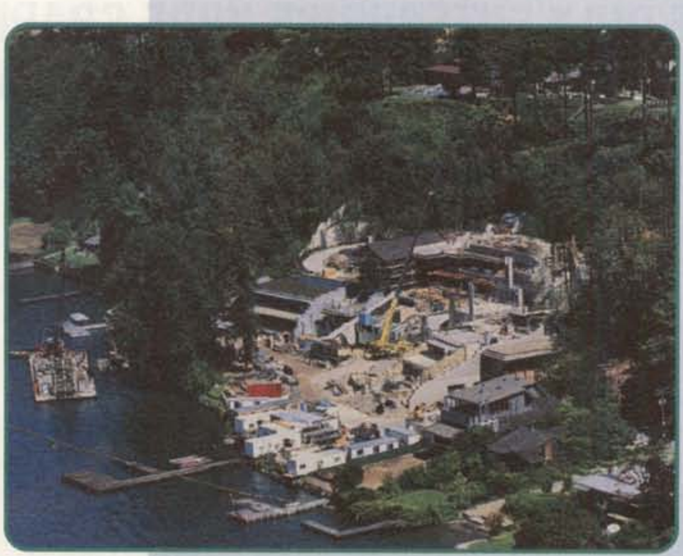
Bill Gates' house

The Gates model

If you had $US53 million to spare, what sort of house would you build? Typically, it would be a fabulous mansion with a huge swimming pool, massive stereos, giant televisions, saunas, jacuzzis. . . you know the sort of thing. Perhaps it lacks a little imagination, but this is what lottery dreams are made of.

When Bill Gates decided to build his ideal home, he wrote, "My house is being designed and constructed so that it's a bit ahead of its time, but perhaps it suggests things about the future of homes." Having made his fortune from Windows, he couldn't very well have the kind that closes with a latch.

The house that Bill built is a $1,850m^2$ reflection of its creator. An elegant mix of wooden panelling and video screens, futuristic technology and rare books. In *The Road Ahead,* Gates claims his priority was that "technology should be the servant and not the master". The house has 80km of communication wiring, but it is hidden deep within the walls. Electrical outlets and phone jacks have been disguised, while the video screens and speakers are enveloped in polished wood when they are not required.



Nothing escapes the wiring process, discreet though it may be. Hidden cameras are everywhere, even inside the stone walls, with sensors in the floor that can track a person to within six inches. The house was designed with acoustics in mind. Panels in the ballroom move out of sight on their own and special speakers in the 18m pool pipe music underwater. The floor is heated everywhere, including the driveway and halls, and the ventilation system has been designed to condition the air for health and comfort.

Video screens throughout the house display artwork, chosen from the 17 million pictures and images to which Gates inherited the rights when he took over digital imagery company Corbis several years ago. Even the old maple tree adjacent to the driveway has not escaped Bill's attention. It is hooked up to a Microsoft computer and monitored electronically 24 hours a day — if it seems a little dry, it is automatically fed with just the right amount of water.

If you were to pay a visit to the Gates house, the entry gate would sense your car approaching and would be open by the time you arrived. On the doorstep, visitors receive an electronic clip that Gates explains will "tell the house who you are and where you are". Each guest provides information about their preferences in art and music, which is entered into a database and relayed to dozens of sensors, which respond as the guests move around. Lights brighten or fade as if by magic, temperatures are adjusted, music preferences are catered for and images on the video screens reflect the taste of their viewer.

The whole concept gets more interesting when you remember that it enables Bill to track every movement of every person in his house, even those of his wife and child. It becomes even more interesting — or perhaps more revealing — when there is more than one person in the same room. Each electronic clip is graded in order of seniority, and the room responds to the most important.

But who is the master when Bill and his wife Melinda get together? And what music will be played when baby Jennifer gets into heavy rock and Daddy has a headache?

Emma Vandore

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Wired home audio

Future sound

The advent of home theatre (simply hi-fi and TV/video in one package) has taken hi-fi from the realm of audiophiles into the homes of ordinary people, many of whom are also computer technology enthusiasts. Audio is becoming essential for any intelligent home, although few companies have the knowledge and experience needed to seamlessly integrate it into home automation systems or computer networks. Instead of having small hi-fi systems in several rooms, audio can be distributed from a single system throughout the entire house. You can have a symphony in the bathroom, and a rock concert in the bedroom, all adjusted via remote controls or wall panels.

Most people wire their homes for home theatre sound, but these systems can also be used for listening to music or any other audio source. Most systems have a conventional stereo mode or special surround modes that mimic the environs where the music was intended to be played; in other words, you can listen to choral music as it would sound in a church, a live rock performance in a stadium, and jazz in a jazz club.

Wiring an entire home is a costly exercise, but one-room audio systems are increasingly affordable. For an ideal home cinema setup, you'll want a DVD player and an appropriate display (see 'Display home', page 84). Then you need a decoder amplifier/ receiver — similar to a conventional amplifier, but able to direct the signal from a soundtrack of a movie and into five different channels. You also need five speakers: one for the centre, two main speakers, and two in the rear. For groundshaking bass, you can also add a subwoofer. The Custom Electronic Design and Installation Association recommends buying five speakers of similar quality and size for dynamic surround sound. As a speaker's magnets can distort picture tubes in CRT displays, centre speakers should be magnetically shielded. Speakers which are to operate near PCs and CRTs should also be shielded to reduce potential interference.

Relatively inexpensive packages are available, and the cheapest have Dolby Pro Logic amplifier/receivers — you should choose those which are upgradable to Dolby Digital and MPEG-2. Dolby Pro Logic and Dolby Digital are the home versions of Dolby Stereo, which you hear in most movie theatres today. Pro-Logic is an analog-based system and has what is known as 'steering' — if something is happening in the left front speaker, the energy is devoted towards it, and there can't be a major explosion in the back speakers at the same time.

The Crestron SmartTouch STS wireless control system can control any device in your home.

All the better processors nowadays run Dolby Digital (formerly known as AC-3). Sound is recorded in six channels, sometimes with a separate bass channel for the subwoofer, and the channels are not mixed at any stage. However, only NTSC laserdiscs and NTSC/PAL DVDs can carry these channels, not videotapes.

A relatively inexpensive single-room audio package is the Yamaha AV-1 CinemaStation ($2,000). It is designed primarily for home theatre use, consisting of a control centre (housing a Dolby Pro-Logic processor, CD player and AM/FM tuner), subwoofer and five small speakers.

The Bose Lifestyle 12 ($4,500) is a more sophisticated system. It can be extended to other rooms, although it is single-source, so whatever is playing on the first driven speaker will play in the other rooms.

A step up from the Bose and Yamaha systems are multi-room audio packages like the Meridian Digital Theatre system, which costs from about $45,000 to $50,000. "It is by a long shot not the most expensive system on the market . . . and in my opinion it is the best you can buy," said Len Wallis, director of Len Wallis Audio (LWA), an audio/visual custom installer based in Lane Cove, Sydney. "With the Meridian system, there is no degradation of signal at any stage, as it is kept purely digital from the CD/LD player to the digital input jack of the five speakers. It adjusts the sound for each room, which is important if you have a room with tiled floors and glass windows where the sound bounces around a lot, and a dead room with thick carpet and heavy drapes. Other systems don't have this flexibility, not without you spending extra money."

In the field of specialised audio controllers — volume adjustors, keypads and remotes – US manufacturer Audioaccess dominates the multi-room market. Because remote controls operate via infra-red eye they are considerably more expensive, but keypads are a cheaper alternative. In Australia, MRS produces a controller which is basically just remote-eye, with no keypad. Another local company, Andrews Audio, produces in-wall speakers, voice controls, wall panels and infra-red systems.

If you want serious convergence technology, Crestron manufactures a control panel called the SmartTouch STS wireless control system. It consists of a touch panel and control processor in one, and operates via radio frequency. It controls any remote electronic device or subsystem, including home theatre components, curtains, lighting and security. Single alarm events can be integrated — for example, when the doorbell rings it is channelled through the speakers. Such a system can easily cost $100,000 to $200,000.

Not that this discourages interest. One of LWA's customers came into the store looking for a $10,000 package, and ended up with a $140,000 one-room system. His home theatre ended up costing about $250,000 after the room itself was redesigned; windows were bricked up, all the walls were double-bricked, and special dampening was designed for the airconditioning. It's a fairly extreme approach, but acoustics can be just as important as wiring, while soundproofing can be a blessing when someone starts listening to heavy metal music while you're trying to study next-door.

Claire Waddell

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Training manuals although good reference tools, fail to contain information directly related to the exams, instead confusing you with endless boring text and colourless graphics. Videotapes are another common training method. Unfortunately videos can only be viewed with a television and VCR, so aren't all that portable, and it's also inconvenient to search hours of video tape to understand a concept that you didn't understand the first time through. Classroom instructor-led training is another avenue, however the exorbitant cost of a course ($9000 or more) seems hardly worth it.

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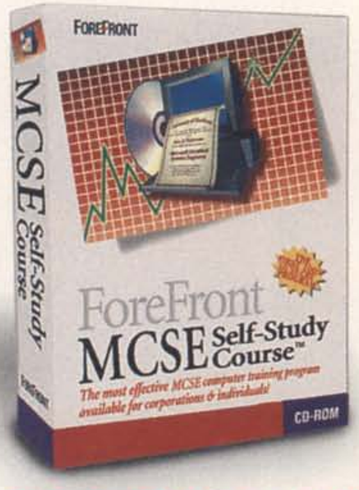
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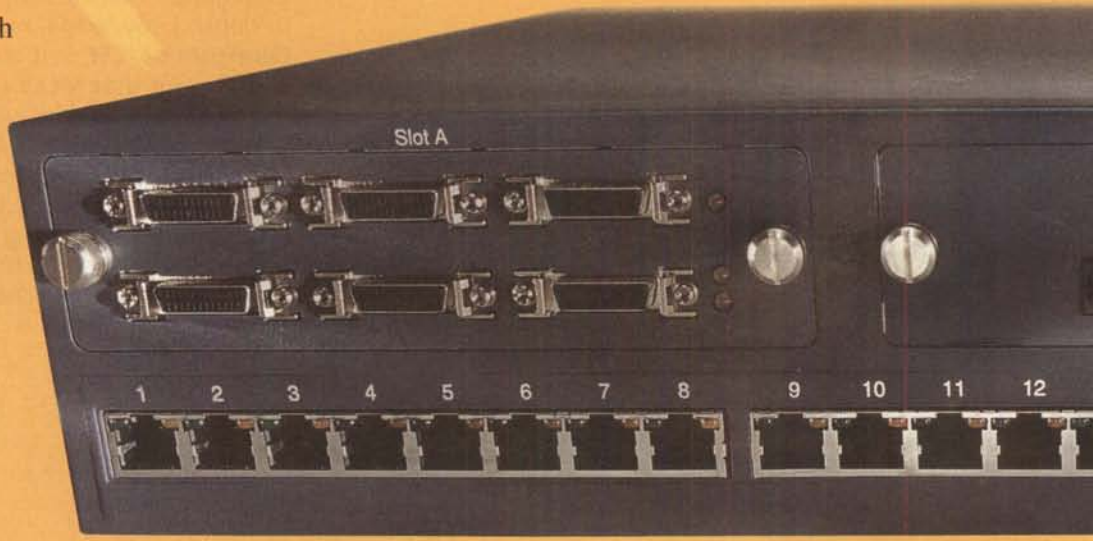

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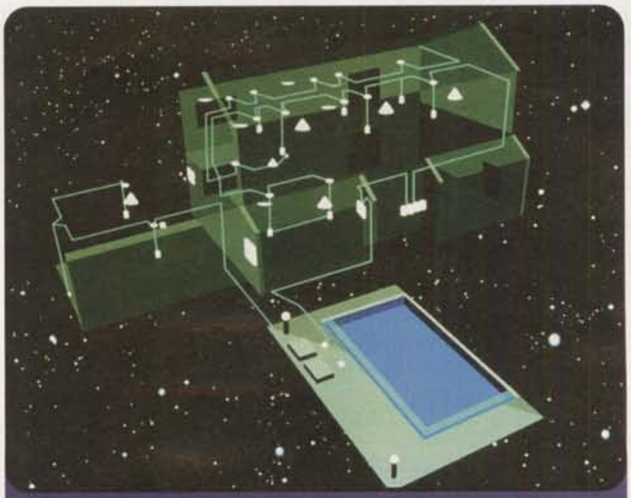
wall which can be adapted to deliver touch-screen control.

Home theatre systems are very much in vogue, costing anything from a few thousand to hundreds of thousands of dollars. Developments in video and audio are bringing genuine cinema-quality facilities to lounge rooms, but many of the most important standards are still emerging, such as DVD and digital television. Computer multimedia and specialised home theatre are on converging paths — increasingly they use the same displays and audio systems (video games are not the only reason), even the same cabling.

Integrate motion detectors and sensors for purposes other than security, and you can potentially have events follow you through the house, adjusting lights and moving multimedia as you require it. This can be aimed at environmental friendliness — for example, Taylor envisages having your PC power up or down as you enter/leave the home office.



Standardise on one system to automate your entire home.

Do you really need it?

If you want automation carried out properly by a contractor, don't expect it to be cheap. Beauchamp estimates his average customer spends $20,000 to $60,000, after which he must make regular service calls (usually simply via a modem to a dedicated PC that can tweak settings). Obviously, the total cost will fall as HA gains a mass market.

If you're not a cashed-up early adopter, you might conclude that for the moment, the only really vital thing is the wiring. Get this right and you're ready to plug in anything as it becomes affordable. In the meantime, you can get some exercise switching things on and off at the wall — do you really want to sit in an armchair with a universal remote control unit, watching TV while cleaning the pool and turning down the oven? Oh . . . sorry . . . you do?

Home wiring

Get futureproofed

Choosing the right kind of wiring for your home depends on the building's age and your estimate of future needs. The home automation industry term for getting it right is 'futureproofing'.

Cabling your walls now will enable you to adopt the entertainment systems, computer networking and communications technologies of the future, probably at much higher speeds than power lines and wireless frequencies will allow. The latter are generally capable of only 1Mbps for data, whereas dedicated cabling will support at least 10/100Mbps Ethernet.

Category 5 data cabling is probably the best choice for the moment. Physically it consists of four twisted-pair standard copper telephone wires in a plastic sheath, and is capable of carrying anything from telecommunications signals to Fast Ethernet.

And then there's RG-6 coaxial cable, which supports multiple bidirectional video sources, such as cable television signals, security camera output and interactive information services. If faithful sound reproduction throughout the house is important to you, consider adding dedicated speaker wiring to the mix — the idea here is to buy the best brand name you can afford.

Fibre-optic cable is expensive and generally regarded in the home automation industry as overkill. Category 5 and coaxial will be just fine for years, and together they meet the requirements of the upcoming CEBus home automation standard. Even old-fashioned Category 1 copper telephone wiring will do for lower-speed transmissions. This is, in fact, all that Clipsal Minder and most other non-AC (electrical wire) automation systems really require, though it would be more common to install Category 5.

For established homes, the options narrow. It's quite possible to strip back the plaster and perform a 'bare wall' installation of up-to-date wiring, but this is quite an inconvenience and a serious investment. If you're happy to run cabling around skirting boards or under cornices, you can get the same technological advantage.

The cleanest alternative, Radio Frequency (wireless networking and automation), is reasonably reliable, but doesn't support higher data speeds. Infra-red is not really an option as the signal can't pass through walls.

Krone's BroadWay package is an Australian-developed structured cabling system which bundles Category 5 and RG-6 cable, targeted at the SOHO market. It uses a patch panel housed in a cupboard, where cables are plugged and unplugged manually depending on your needs. If you want to redirect the flow of data, sound or video from the lounge to your bedroom, you move the cable to the correct jack. However ingenious this is, it adds an extra task for the user — hardly home automation — and an automatic or remote-controlled switching facility for BroadWay will be required before it really takes off.

Star-wired structures like BroadWay's are desirable, where all wiring leads back to a central point rather than simply meandering through the building in an old-fashioned daisy chain (series or loop) format.

Most importantly, make sure the technologies you choose are Austel-approved and that whoever handles the installation has an Austel licence. Increasingly, electrical contractors used to installing everyday power wiring are also experienced in data and video cable installation, but be sure of this before you assign the task.

Simon Vandore

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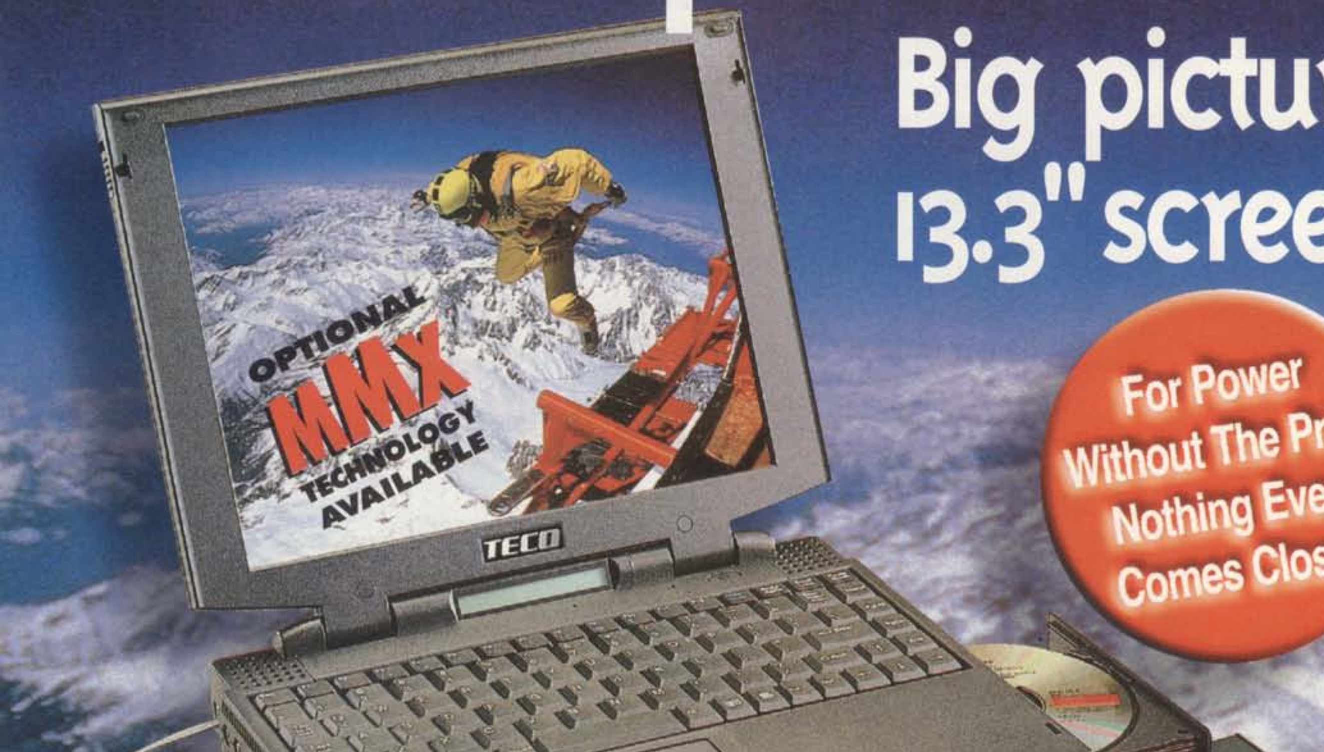

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Command control

How do you choose the right home automation system in a minefield of developing standards?

More than 20% of new homes built in the US for over $US200,000 have embraced home automation, and that's expected to triple in two years. HA detractors would say it's a great way to spend lots of money to complicate your life in the name of convenience. But for those people who successfully implement HA, the payoff far outweighs the capital cost and teething problems of an emerging technology.

In spite of what the manufacturers and logic might tell you — that HA is a hot topic and inevitable — the market and its products are far from mature, and fully embracing HA today comes with certain inherent risks.

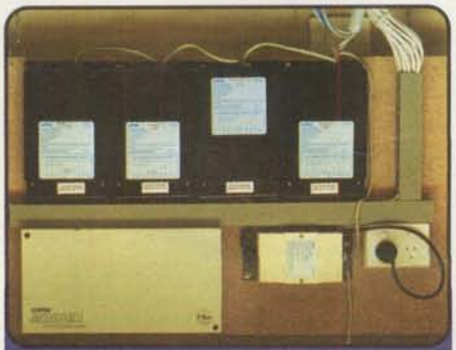
First, there is the problem that it is a market with few suppliers and limited outlets. Critical mass drives down price, more manufacturers (and importers) jump in and then, you've got it, there are lots of choices, great service and competitive prices.

Secondly, while some manufacturers might tell you otherwise, this is not DIY territory — you will need to talk to some professionals if you want to have a happy outcome. If you're building, it's a good idea to check if your architect is compatible with the concept of putting your life in the hands of a remote control.

You'll also need to find a builder and, more importantly, an installer (read 'electrician') who shares your enthusiasm; otherwise you'll pay, pay, pay, and most likely end up with a hell house rather than a dream house.

On the other hand, if you're thinking of converting your established home to futureworld then you've got the additional problems (and cost) of ripping out your existing wiring without trashing what you've got in the way of walls, floors and ceilings. Reminds me of a show on US TV called 'This Old House'. Basically, the concept was that one man and a reciprocating saw would 'remodel' a house in the space of a 30-minute show: 'Hey, let's put a door here!' Rip, rip, saw, saw. In fact, nowadays the show even has a Web page with a story about home automation wiring (http://bigmouth.pathfinder.com/TOH/96_01).

But perhaps the biggest cloud looming over the automated house is the 'C' word.



In Sydney's Observatory Tower, everything links back to a Minder system.

Compatibility continues to be the single most critical (and yet unresolved) factor in choosing the right system. Pick one type and you might end up with the Beta cassette of home automation; choose another and in a year from now that intelligent fridge or washer or water heater you just bought might be talking gobbledygook to your system.

But still you say, 'I want it, and I want it now!' Well, step right up, because dreams *do* come true.

You'll be looking for branded suppliers. There are only a few local ones — names like Clipsal, HPM, Honeywell, Krone and Mod-tap. There's a system called Jeeves from The Smart Company which is now the basis for many of the Clipsal products.

Of course, you could also cobble together something from bits you bought from the Web, but I wouldn't advise this. Apart from the distinctly different voltages and frequencies used overseas, you'd be out of luck if you needed service, or if your house burnt down because your homebrew whizz-bang automation system flamed out.

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Local options

When comparing systems available locally, you should consider your desired level of involvement, as well as functionality. If you find programming the clock on your VCR daunting, an HA system with highly flexible programming could turn out to be a time bomb.

The Oscar system from HPM is designed to more or less set and forget, and is not designed to interface with your home PC. Instead, you communicate with Oscar via a keypad, switches, dimmers, PIRs and remotes.

HPM's Oscar control panel.

The basis of Oscar is the proprietary bus that runs throughout the house. When you press a wall switch, you send a signal back along the bus to the central processor where the request is carried out. That could be as simple as turning a light on or off, or activating a programmed event like dimming several lights or adjusting the heating and setting the alarm system and outside lighting before bed.

Events may be variable and programmed to occur at certain times or on certain dates, and the initial setup is customised by the installer. Lights, heating, sprinklers, garage doors, blinds and drapes, pool filters and a security system can all be controlled by the one device.

According to Wildon Parker, national product manager for HPM, Oscar is targeted at the residential market and is designed to be reliable and not require any advanced technical knowledge to operate on a daily basis. When functions need to be altered, the owner's manual steps the user through the processes. Oscar is available throughout the country via a network of electrical wholesalers and installers.

The Oscar product range includes switches, relays, sirens, dimmers, motion detectors and remotes that provide a range of typical solutions in most premises.

If you're looking for a more hands-on relationship with your system, then Clipsal's Minder has your name on it. The system runs on the company's C-Bus platform and, like the Oscar product, provides for remote access to functions such as lighting, heating, pool, security and so on. But the exciting part for computer-literate homeowners is that Minder is configurable via your PC. A Windows-based software interface provides access to a programming language that:

- programs the C-Bus modules with operating variables including group addresses, unit addresses, mode of operations and control relationships;
- monitors the status of the C-Bus network, and can report it to a PC terminal for diagnosis;
- controls the C-Bus network (with commands output from your PC to control or change the network status);
- provides onscreen help, database and network management facilities;
- allows you to input data using either a graphical interface or an advanced template screen for custom programming;
- gives you a network topology editor.

Plenty of documentation relating to the C-Bus system is included, describing network topologies, system limitations and performance, along with a step-by-step guide to programming each of the C-Bus module types. There's an installation manual that explains how operating variables such as Unit and Group Addresses are determined, and a fault-finding guide for troubleshooting C-Bus installations. If you are professionally qualified to get down and dirty with setting up your own HA system, this may be the one to go for. Perhaps it's also the ideal system to experiment with after contractors install it for you.

Honeywell, meanwhile, has based its system on the CEBus standard, betting that this will be the future of HA. Its Total-Home package allows appliances and premise systems to be programmed via a personal computer. CEBus is an open system, complying with American National Standards, allowing appliance manufacturers to build compatible units that will integrate with other products. Communication occurs via twisted-pair, coaxial, fibre-optic or radio devices.

Paul Swain, Honeywell's Business Development Manager, says the company is expecting up to 20% of all homes to be automated in the next two years.

However, until the jury returns — and the verdict on what is the standard may well rest with appliance manufacturers — there is an inherent risk in committing to any system that may not interface with or be upgradable for the appliances and devices of the future.

On the other hand, as the computer and video industries have already shown us, throw enough dollars at a problem and anything can be made compatible. The trick is picking the winner before the problem arises.

By Jason Gregg

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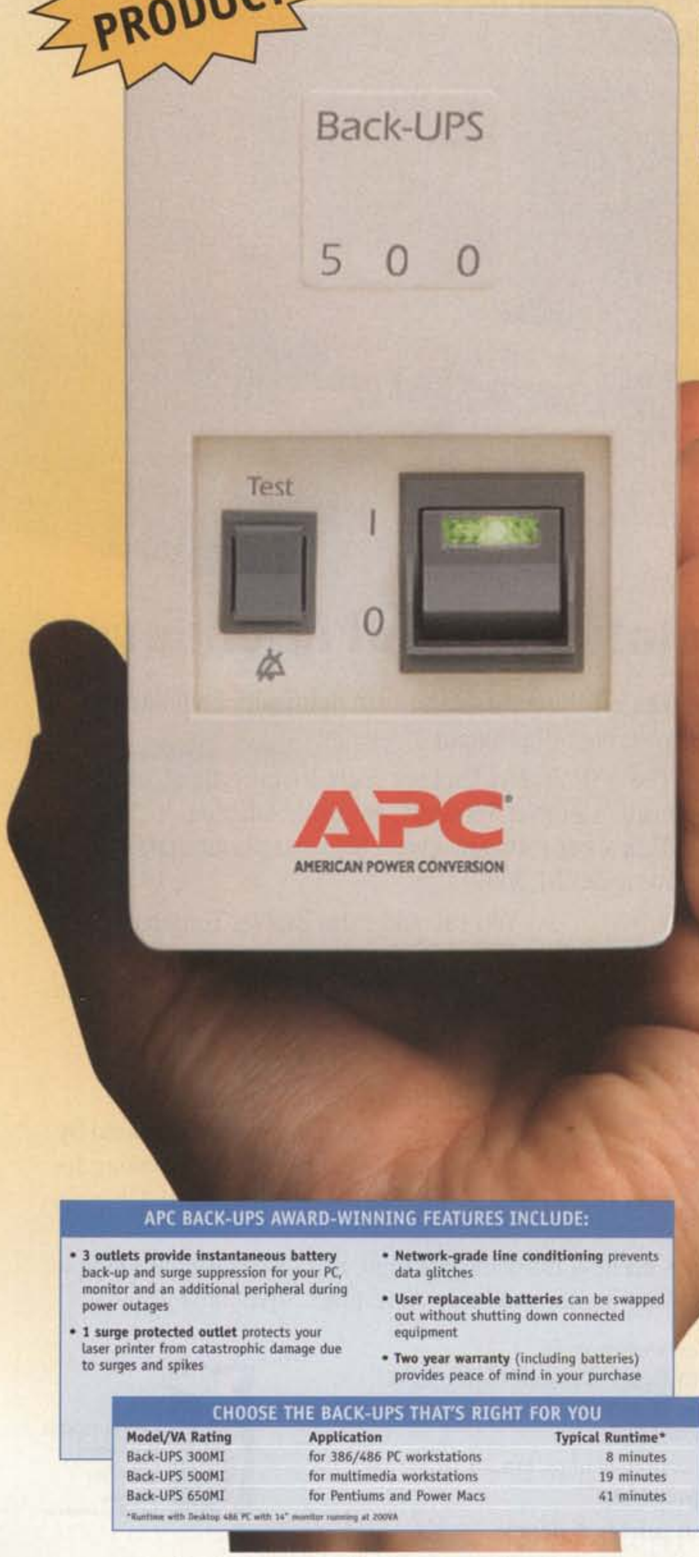

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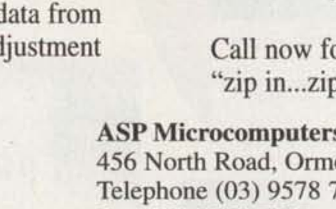

The product is ASP's ZipNet, and it comes as a complete package of hardware and software. The ZipNet Terminal displays the time and collects the barcode scans, then ASP's ZipNet Timesheet software (for Windows) collects data from the Terminals, applying the shift and time adjustment rules you've set for your workplace.

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A rough guide to neural networks.

By Craig Kirkwood

Building a better brain

The field of artificial neural networks attempts to use computers to handle data in a human way. In this work, technology is used to simulate human methods of analysis and handling of abstract concepts. The importance of artificial neural network technology will intensify in line with our ever-increasing need to interpret data which behaves organically, but requires interaction with a digital world and an analog user.

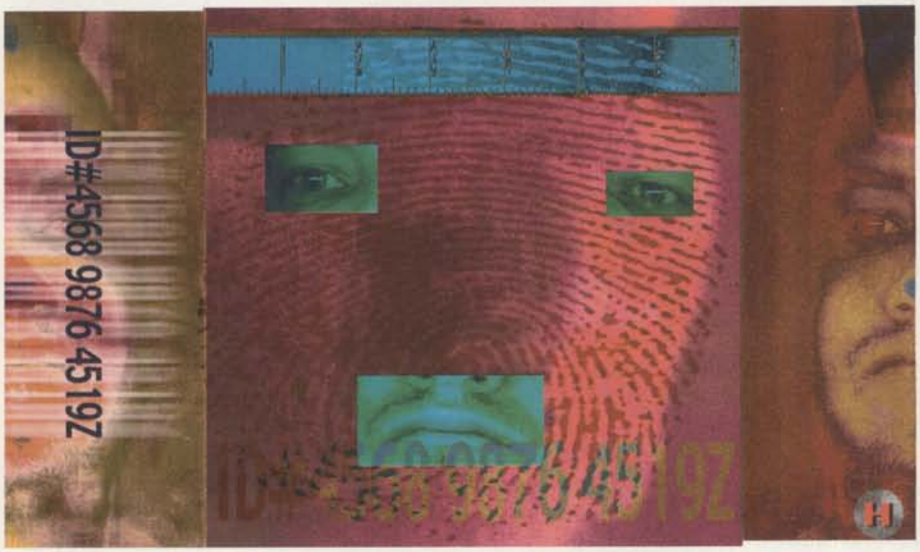
A neural network can be defined as an interconnected assembly of processing elements whose function is loosely based on that of the brain. So it's worth taking a look at how the brain itself works.

The brain is a network in that it is constructed of related, interconnected components. It is also part of a larger network, the central nervous system (the brain and the spinal cord), which is in turn part of the nervous system.

Of the three main components of the brain, the cerebrum is more highly developed in humans than in any other animal. Its outer layer is the cerebral cortex, which consists of a layer of neurons some 3mm thick and grey in colour. In the human brain there are some 12 billion primary neuron cells, and it is their interconnection that describes the neural network of the central nervous system.

Neurons consist of several parts. The main body has a nucleus in the centre, and then there are dendrites (which receive messages from adjacent neurons), and axons (responsible for communication through transmission to the next neuron). At the end of the axon is a series of tentacles leading to a 'terminal'.

Axon tentacles converge at a synaptic junction. It is by way of the synaptic junction or synapse (the region of contact between the axon and the next neuron) that transmission occurs between neurons. The synapse is actually a tiny gap across which a transmitted charge flows when the electrical potential reaches a certain threshold — not unlike the principle of a spark plug.



The cortex is important to neural network research because it controls the sensory functions: vision, hearing and touch. It also controls more complex aspects of behaviour such as memory, thought and language.

Fuzzy logic

Some of the important features of the brain, and thus of neural networks, are that it is non-linear, distributed and adaptive. That is, the brain does not consist of two-state, discrete cells which are arranged 'logically' (in the Boolean sense). Rather, each neuron in the brain is a product of the synapses to which it is connected, and 'fires' when a cumulative threshold is reached.

The 'decision-making' of the neurons is often referred to as fuzzy logic. The firing stimulates other neurons which may then activate a muscle or process a thought. But it is not an all-or-none decision. Rather, it is based on 'graded potential'.

Stimulation may be either excitatory or inhibitory (it may cause or stop an action), and it can vary in strength. There is also a time variable, depending on how long it takes to reach the threshold for activity. Recent studies have also shown evidence that 'phase' (as in wave motion) may play a role in the decision-making process of neurons. This means there is a non-specific threshold of action, which makes the brain probabilistic, uncertain and to a degree unpredictable. And while those characteristics may cause an engineer to cringe, they are entirely consistent with the natural world, and fortunately go hand-in-hand with some very favourable attributes.

How a neural network works

Like the brain, artificial neural networks are built from a large number of processing elements (neurons) that individually deal with pieces of a big problem. A processing element simply multiplies an input by a set of weights and transforms the results into an output value.

The power of the network comes from the massive interconnection among the processing elements which share the load of the processing task, and from the adaptive nature of that interconnection.

A digital machine takes one instruction at a time from memory, processes it, and stores the results in memory. If the memory is damaged, the data is lost. On the other hand, the interconnection of neurons in a neural network means that the same information is stored elsewhere or can be induced or inferred from other related information. The collective nature of the neurons builds information by a process of redundancy, inference and, more importantly, learning.

The most basic and commonly used neural network architecture is the Multilayer Perceptron (a model may be downloaded from http://www.cs.bgu.ac.il/~omri/Perceptron), first described by Frank Rosenblatt in 1962 in his book *Principles of Neurodynamics*. Put simply, the performance of the Perceptron is measured in terms of a desired signal and an error criterion. The output is compared with a desired response and an algorithm called 'back propagation' is used to adjust the weight of the connections to reduce error. The network learns by repeating the process until the correct result is acquired.

Application

If artificial neural networks are based on the nervous system, which has to do with a non-logical, biological organism, the practical applications will relate to the actions of the natural world. These include: quality control, economic forecasting, speech recognition, face recognition, handwriting recognition, oil and gas exploration and securities trading. Of these, speech, face and handwriting recognition are receiving the most attention in the struggle to find a secure method of identification for security systems.

In the world of electronic banking, for example, PINs (personal identification numbers) can be forgotten or passed on to a third party. Likewise, a signature is easily forged and, for that matter, easily forgotten.

But an individual's handwriting, face and voice are all unique biological data in the same way that DNA is unique. A system that can recognise these things is a much more effective tool against fraud.

How to get your own neural network

Most of the research on neural networks is in software emulation rather than hardware systems. Consequently, a lot of applications are freely available for download for either Unix or Windows platforms. Making use of these models and examining the source code gives some insight into the way researchers are creating networks using conventional hardware. Here are some examples *APC* has found useful.

Neuro Solutions http://www.nd.com. The neural network Simulation Environment (includes a downloadable demo).

KeyWare Technologies http://www.keywareusa.com. A commercial recognition system.

The Face Recognition Home Page http://www.cs.rug.nl/~peterkr/FACE/face.html. A collection of sites covering all aspects of recognition.

The Computer Vision Home Page http://www.cs.cmu.edu/afs/cs/project/cil/ftp/html/vision.html. An academic site with lots of information and further references.

Another interesting application is in forensics. Phantomas (http://www.zn.ruhr-uni-bochum.de/work/k1/s110e.htm) is a commercial face recognition system developed by Germany's ZN Bochum for use by police departments.

According to Bochum, the manual examination by witnesses of a database of criminals' faces is flawed, since the user's attention tends to drop drastically after they have scanned the first few hundred images. Phantomas allows the computer (running on Windows) to search facial databases and come up with possible matches. The success of this system depends on the accuracy of the template, but the company also manufactures a security system based on the same engine and claims accuracy of 99% to 99.5%.

Another area of intense research is in economic forecasting, which requires analysts to track the natural cycles of financial markets. A neural network is suited to the task by its ability to learn from historical trends and infer future activity.

One commercial product now available for tracking and predicting the value of a portfolio is NetProphet (a demo is available from http://www.neural.com). This product was developed by US R&D outfit Neural Applications, and is considered by analysts to be a pioneer in the field of 'intelligent decision software'.

Neural's focus has been the development of systems which extract 'current knowledge' from complex databases. But the company has also applied the technology to applications such as process control in the metals industry, along with intelligent search facilities on the Internet, an area gaining momentum in the fallout from push technology.

Neural Internets

Push technology was conceived to deliver content to the desktop without the need for user-initiated searching. The limitation of most existing systems inherent in browsers or available through third-party plug-ins is that they deliver content with only a partial knowledge of what the user wants. The solution may lie in more sophisticated user-profiling and agent technology.

Several companies are operating in the arena of intelligent search agents, including Firefly, Open Sesame and Net Perceptions. Most of these are using one of two filtering processes to ascertain a user's profile: collaborative filtering or content-stream filtering. Collaborative filtering is a system where algorithms match the user's distilled opinions to those of thousands of others, then makes recommendations as to what they may like in, say, books or music or some other product. On the other hand, content-stream filtering is where the agent monitors what the user is browsing and searches for key words or concepts.

A Californian start-up called Autonomy is making use of neural network technology in its Agentware suite. The company's 'adaptive probabilistic concept modelling' system makes use of pattern-matching algorithms, contextual analysis and concept extraction to analyse a body of text and identify key concepts within it. The system allows for both frequency and relationships of terms that closely correlate with meaning.

Once the key concepts in a text are identified they are encoded in 'concept agents'. These are then employed to look for concept matches in any source of text or to find other agents that contain similar concepts.

Beneath the Agentware model is a neural network system called the 'dynamic reasoning engine' (DRE), which Autonomy's parent, Neurodynamics, has been making use of since 1991. The engine processes text into an agent, which represents the aggregate of the most important concepts in the source.

With the overwhelming increase in information sources now available, the ability to search large databases intelligently and ascertain complex concepts and related themes will continue to be the most demanding and necessary applications of neural network technology.■

Technology developments have taken biometrics, or personal recognition methods, to new levels. **By Josh Gliddon**

Identify yourself

Mention the word 'biometrics' at your average dinner party and you'll probably be met with a bunch of blank stares. Try 'fingerprint scanning', 'retinal scanning' or 'facial recognition', and you may get a different reaction.

For many people, the very idea of biometrics is considered right up there with the Australia Card, Orwell's *1984* and big government, because it presents a perceived opportunity for those in power to keep tabs on the average citizen.

Arguments about government snooping and privacy in general (see page 102) tend to ignore the fact that biometrics, which is really nothing more than using unique physical characteristics as a means of identification, has been in use for thousands of years. The only thing that has changed is the technology.

The Chinese are known to have long-used a thumbprint in sealing wax as a means of establishing the provenance of official documents. But it wasn't until the US FBI began keeping fingerprint records towards the end of the 19th century that biometrical data became an official and almost irrefutable way of establishing identity.

Until then crude physical data such as eye, hair and skin colour, as well as height and build, were the only means authorities had of establishing identity. That and asking known associates, of course.

Obviously these distinguishing characteristics aren't difficult to fake or disguise, and they were therefore a relatively unsatisfactory means of establishing identity. Fingerprints, on the other hand, are unique to each fingertip and each individual. Even identical twins do not share fingerprint patterns.

Babies know all about using biometrics for identification: their sophisticated CPUs are able to distinguish individuals based on voice intonation from only a few weeks after they emerge from the womb. Even today's high-performance processors from the likes of Intel and Sun have difficulty coming to terms with simple speech-to-text applications, and are completely unable to acquire independent knowledge themselves.

The fact that we're using physical characteristics as a way of identifying people has not changed. Rather, the change has been in the enabling aspects of computer technology — a revolution powered by the so far immutable fact of Moore's Law. In case this is the first time you've heard the term, Moore's Law states that processing power doubles relative to price every 18 months.

And while computers keep getting faster and cheaper, people keep discovering new

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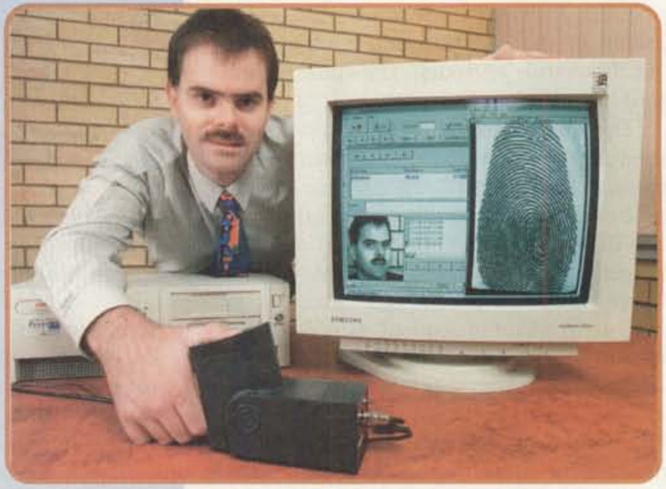
and exciting things to do with them, like harnessing the power of the Internet. Without the underlying impetus provided by Moore's Law (which had its genesis in the US military industrial complex during the 1960s), the Internet would not exist.

Without the Internet, we wouldn't be able to do things like check our bank balances from the comfort of our PCs. The inherent problem with this is security. If, for instance, you're online in Sydney and your bank's servers are in Brisbane, the Internet Protocol (IP) directs your banking details every which way it can en route to the server. How does the bank know you're who you say you are? How do you know the bank is what it says it is?

It's this core problem of security and authenticity — allied with a whole lot of other issues — that has kept a brake on the growth of the electronic economy.

Sure, encrypted PIN numbers are fine — that is, until someone discovers your PIN and then finds out that your PC's password is something brainy like 'password'. After that, any pretence of security can be dispensed with. Herein lies identification lesson number one: the effectiveness of a method of identification is inversely proportional to the ease with which that method can be counterfeited.



However, it's also true that the degree of security should be proportional to the potential loss that would be caused by the failure of that security. That's why for the last 20 years or so banks have been happy to let their customers access their accounts using a PIN at an ATM; the potential loss is usually relatively small, and the account holder can often be held liable. But you can bet that the security level covering inter-bank transactions is significantly higher than a four-digit PIN.

Modern biometric applications, thanks

Does Big Brother have your number?

Information collection is a part of life. Just as it's compulsory to vote in elections in Australia, it's also compulsory to fill out a census form every four years. The way in which the information gathered from the census is used is governed by legislation. Although it's possible for marketeers and others to purchase general demographic data, specific information about individuals and families is not available.

Private entities and the handling of personal data by them is not governed by privacy legislation, although various industries have codes of conduct outlining how members should treat personal information.

"The problem with private entities collecting personal data is that, with all the best intentions, data tends to leak into places it's not supposed to go," said a spokesperson for the NSW Privacy Commission. "Because the Privacy Act [1988] does not specifically cover the handling of personal information, there aren't any penalties for abuse."

Biometric data is simply another form of personal — very personal — data. Therefore, the way that biometric information is handled is not governed by any particular law.

Despite concern from various quarters about the potential for the abuse of personal information by the private sector, the Federal Government has consistently refused to enshrine the protection of personal information in law.

Instead, in March 1997 Prime Minister John Howard directed the Privacy Commissioner, Moira Scollay, to develop the National Principles for the Fair Handling of Personal Information (NPFH) in consultation with private industry and representatives of privacy groups.

In essence, the NPFH attempts to 'balance the right to privacy with other claims and interests', by outlining appropriate ways for organisations to handle personal data. It does this by recommending that information be available for inspection and correction by the individual concerned, as well as by outlining the circumstances in which the collection and sharing of personal data is permissible. It does not cover dispute resolution or compliance. Nor do the principles apply to employees.

Because the NPFH are guidelines, not law, they have taken flack from privacy organisations arguing that legislation is required to protect an individual's information. In this year's March 5 edition of *The Australian*, Federal Afttorney General Daryl Williams replied to calls for more stringent privacy legislation, saying that "the Government believes legislation will not be necessary, provided that business responds to the challenge of providing effective privacy protection".

The potential for abuse of personal data was foremost in the minds of the Shop, Distributive and Allied Employee's Association (SDA) when retailer Woolworths informed the union it was planning to introduce fingerprint scanners made by FingerScan to keep track of employees.

Woolworths declined to discuss the implementation of the FingerScan system with *APC*, as did NSW Corrective Services (which uses a different fingerprint recognition system) and Armaguard.

The NSW Privacy Commission and the SDA approved the use of the FingerScan system because the implementation does not allow the comparison of a person's fingerprint against a centrally stored database of template files. Nor does it allow a fingerprint to be extracted from the file.

In addition, the NSW Privacy Commission's approval was based upon Woolworths using FingerScan to record only meal and clock-on/clock-off times, along with the proviso that an employee's biometric data was removed from the system at the end of their employment. Details of the conditions for biometric system use in NSW Corrective Services and in Armaguard were not available.

The National Principles for the Fair Handling of Personal Data can be found at http://www.hreoc.gov.au/privacy/natprinc.htm or by calling (02) 9284 9709. Further discussion of the issues associated with privacy in the information age can be found at http://www.anu.edu.au/people/Roger.Clarke/DV.

Josh Gliddon

to technology, are on the way to solving some of these problems, as well as providing answers for a few they weren't asked to solve. Retailer Woolworths, for example, has FingerScan biometric units at its stores in place of bundy clocks and timesheets, as does security outfit Armaguard. The NSW and Queensland prison systems use a different type of fingerprint system from FingerPrint Technologies to keep tabs on visitors.

FingerScan managing director John Parselle: Databases can be the start of a slippery slope.

These applications can easily give the impression that modern biometrics, or electronically assisted biometrics, is simply an extension of analog biometrics because of its preoccupation with fingerprints. But this isn't the case.

Facial recognition

Because faces are constantly changing, teaching a machine to recognise one is more difficult than teaching it to recognise a fingerprint abstraction.

Facial recognition has two distinct advantages over all other biometrics: it can recognise individuals remotely, and once a facial recognition technology is smart enough, it's relatively simple to incorporate it into a standard security/surveillance installation.

There are two established methods of recognising faces: eigenfaces and eigenheads; and Local Feature Analysis. Eigen- faces and eigenheads work by adding together one-piece representations of whole faces until a suitable match is reached. Eigenfaces has the problem of responding badly to off-axis image acquisition, as well as to variability in lighting sources. Eigenheads makes similar global assumptions about a 3D representation of the head instead of a 2D face.

A more effective system known as Local Feature Analysis (LFA) provides the facial recognition application with 'local building blocks' or facial elements, instead of entire faces. It is also better able to account for variations in hair, lighting and pose. This superiority is attributable to the greater 'granularity' that having facial elements instead of entire facial representations allows.

Once a facial recognition technology is smart enough, it's relatively simple to incorporate it into a standard security/surveillance installation.

Using facial recognition technology it is also possible to add anonymous faces to a database for comparison with other acquired images for correlation later. This may be useful in high-security environments, or in environments that are liable to attract a measure of undesirable individuals, such as casinos. We were unable to ascertain whether this technology is currently in use in Australian casinos.

Another process related to facial recognition is facial thermo imaging. This process uses an infra-red camera to take an infra-red representation of the capillary and vein patterns unique to individuals. This pattern can then be abstracted using an algorithm into a template and then rendered like fingerprint and iris patterns.

Iris recognition

Iris recognition is based on the fact that the iris (the coloured part of the eye) has patterns that are so unique that the odds of two individuals — even identical twins — having the same patterns is extremely small.

Iris recognition works in much the same manner as technologies used to acquire fingerprints. Light is bounced off the iris and reflected in different ways depending on the patterns of the iris. This return signal is detected by the recognition device and then converted into a numerical value using proprietary algorithms. As with other biometrics, the numerical value of the returned signal is called a template.

When a user steps up to an iris scanning device, the pattern from their eye is

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Hand recognition technology

Although hand geometry can be related to fingerprint recognition in physical terms, it's important to make the distinction between these two biometric technologies.

Hand geometry recognition relies on matching the actual geometry (physical configuration) of the hand with a stored representation. While it's possible to use finger geometry as a biometric, the lesser number of recognition points compared to a hand makes it inaccurate. Instead, fingerprint biometry takes a representation of the fingerprint and matches it against a stored record of that print.

Fingerprint recognition is the most commonly used biometric because of the large number of recognition points on each finger — around 100 — as well as the fact that each individual has 10 digits for verification. A finger's recognition points are described using terms such as rolls, whorls, valleys and ridges, and it is these recognition points that are abstracted by fingerprint-centric biometric technologies.

"The beauty of fingerprints," said John Parselle, managing director of FingerScan Australia, "is that almost everyone has fingers, and if they don't, there are toes!"

It's also difficult to forge a fingerprint, as all the fingerprint recognition systems on the market today will not accept copied representations of fingerprints. Nor will they recognise a facsimile of a print held up to a scanner.

There are two different types of fingerprint recognition technologies currently in use in Australia. The systems are offered by FingerScan Australia, a subsidiary of the US-based Identix Corporation, and Brisbane-based FingerPrint Technologies. It's important to note that while these technologies are different, they are not the only ones on the market. They do, however, illustrate the differences between a verification-type biometric system and an identification system.

FingerPrint Technologies' managing director Gerald Shehadie described the sale of its fingerprint recognition system to the Queensland and New South Wales Corrective Services departments as "a great reference for us".

The system is designed to combat the inflow of contraband into jails by verifying the identification of each visitor. Not only does it help identify each visitor to the jail, it stops visitors making multiple visits under different names.

"The future of this sort of technology is in passport applications, where you need to do a lot of database searching, but it's not restricted to that," Shehadie said. "We've had interest from hotels that want to use it for guest access control."

FingerPrint Technologies' system involves, from the back-end forward, a database (any will do), a Windows 95 or NT PC on which the biometric application runs, and a scanner. The scanner bounces light off the fingertip and records a representation of the fingerprint called a template. A number is assigned to a defined set of fingerprint identification points. The resulting set of numbers is then used to generate an algorithm that in turn generates the fingerprint template.

The numerical template generation process is a one-way process. "Even if someone had our software, a scanner and the fingerprint template, there is no way that it can be 'reverse engineered'," Shehadie said. "You can't extract a fingerprint from the template."

Like FingerPrint Technologies' method, FingerScan's technology also bounces light off the fingertip. But instead of assigning numerical values to the recognition points, it measures shadows.

"With fingerprinting you're looking at a 2D representation. It is looking at 150 identifiers, and that produces a highly unique pattern," said Parselle. "So what that means for us is that ridges and valleys reflect light in different ways, and we collect resulting data."

The numerical template resulting from FingerScan's scan can then be stored either on a smart card, in the device itself, or even on a networked computer. "We don't really care where [it's stored] as long as it's secure," Parselle said.

After the individual has been enrolled in the biometric system, a PIN number is assigned to their record. When individuals attempt to verify themselves, they enter the PIN, their finger is scanned and the resulting scan is compared with the stored template. If the template and the scan match, the individual is accepted.

Differing opinions

"FingerScan is good at doing one-to-one searches," said Shehadie. "You've got the PIN and the record on file, and that's compared to the scanned image."

"We can search large databases, up to 100,000 files per minute," he added. "You put your finger on the reader, and it tells who you are."

Meanwhile, Parselle said he considers invasive those finger recognition technologies that can be searched against a database. He pointed the finger at vendors that simply store encrypted 2D representations in a database.

"You could legitimately say that they're building a fingerprint database, and even if they say they've encrypted it, so what?" he said. "They could be forced to decrypt it, and once you're at that point, it's a very slippery slope."

Both companies emphasised the compactness involved with fingerprint templates. "Ours are typically 100K to 150K in size," Parselle said. Shehadie said FingerPrint's template sizes are similar.

Josh Gliddon

matched, generally using a PIN, with the template stored on file. If the template and the scan match, the user is granted access.

Iris scanning has several advantages over other biometric techniques. The most notable, as with facial recognition, is that it is not invasive and requires little conscious effort from the user. Newer systems allow iris images to be acquired from approximately a metre away, further diminishing the level of interaction required from the user.

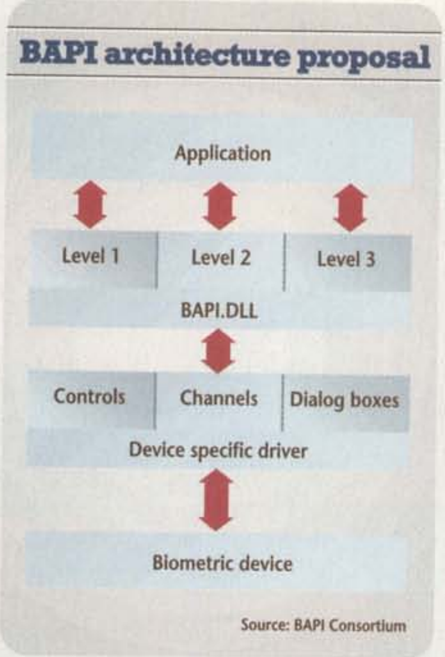
Several companies, including Siemens-Nixdorf and NEC, have iris-scanning automatic teller machines in prototype testing. However, it is unclear when, if ever, they will be released to market.

Are you, or aren't you?

While technology has radically changed biometrics, what hasn't changed is the fundamental schism separating biometric technologies that can be paralleled to the differences between the Chinese approach and that of the FBI almost a thousand years later.

The ancient Chinese biometric system was based on verification. In order to ascertain that a certain document was legitimate, it asked 'are you who you say you are?'. The FBI's fingerprinting system differs because it is based on identification; it asks 'who are you?', and then attempts to match the identity of the person in question with a database of people whose identities have previously been established.

This may sound like an exercise in semantics, but it isn't. Biometric systems exist that simply check your record against a previously logged record for you; if they match, you're in. This is called verification. Other biometric systems run your biometric against a database containing biometrics records matched to personal information in an attempt to identify you.


BAPI architecture proposal

Source: BAPI Consortium

Other systems again can record your biometric data without you knowing, and then keep it on file to be matched against other personal data at a later date. This could well be described as an intrusion of privacy, but it is possible, and most of the technology to make it happen can be bought off the shelf .

One certainty is that biometrics won't go away. Research organisation Gartner Group has biometrics pegged as one of the top 10 technologies to watch in 1998. Coincidentally, electronic commerce, an application to which biometrics is perfectly suited, is also listed by Gartner.

Telstra has just introduced smart card-enabled phones, the first widespread use of smart cards in Australia. Meanwhile, a consortium of US and European companies has developed a specification for getting a 32-bit microprocessor onto a smart card, which is the perfect vehicle for carrying biometric data.

There's also the BAPI (biometric application program interface) initiative, which aims to negate the incompatibilities between different biometric hardware and software by developing a Windows API that will allow software from one vendor to address hardware supplied by another vendor. In theory, this should make setting up a finger scanner as easy as plugging in an inkjet printer.

The BAPI consortium intends to develop APIs for Win32 operating systems running on Intel hardware. Although it does not rule out the extension of BAPI to platforms such as Macintosh, Solaris and Java, no release schedule has been set.

BAPI architecture consists of three layers. Layer one is designed to allow easy access to basic biometric functions for prototyping purposes. Layer two is greater in complexity but allows developers a higher level of access to biometric functions, while level three is a low-level regime that allows access to specific device functionality (see diagram on this page). In addition, BAPI literature outlines a potential fourth overlaying level to allow the development of 'platform-dependent and device-specific user interfaces for common functions'.

Along with developments like BAPI, the unrelenting increase in PC price/performance means that within the next two years biometrics will well and truly have made its break for the public stage. And in time we'll all have little finger scanners placed right next to our PCs.■

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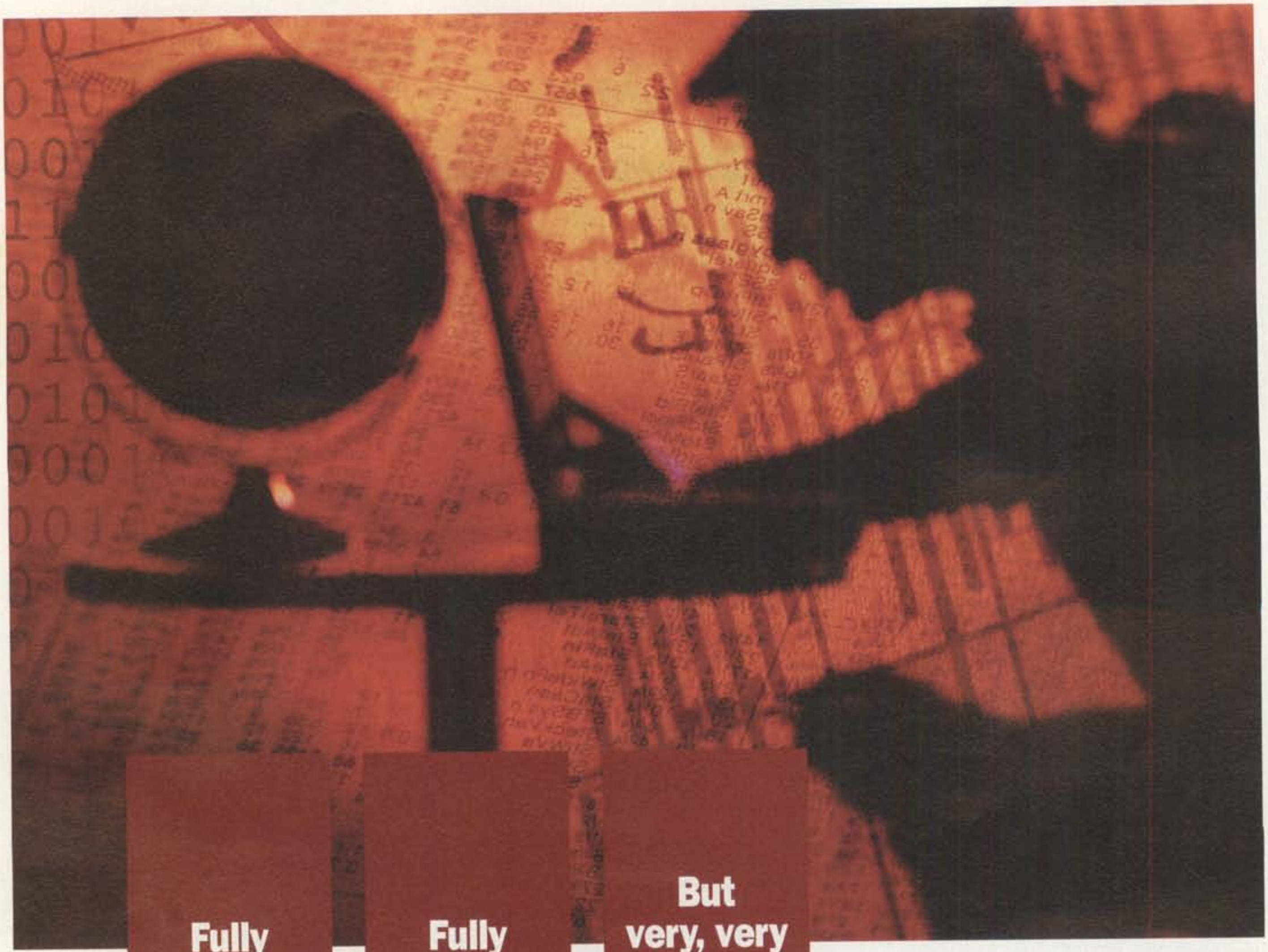

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Even as the price of colour has fallen, A3 colour printing has remained out of the reach of most of us — until now, that is. **By Jim Endersby**

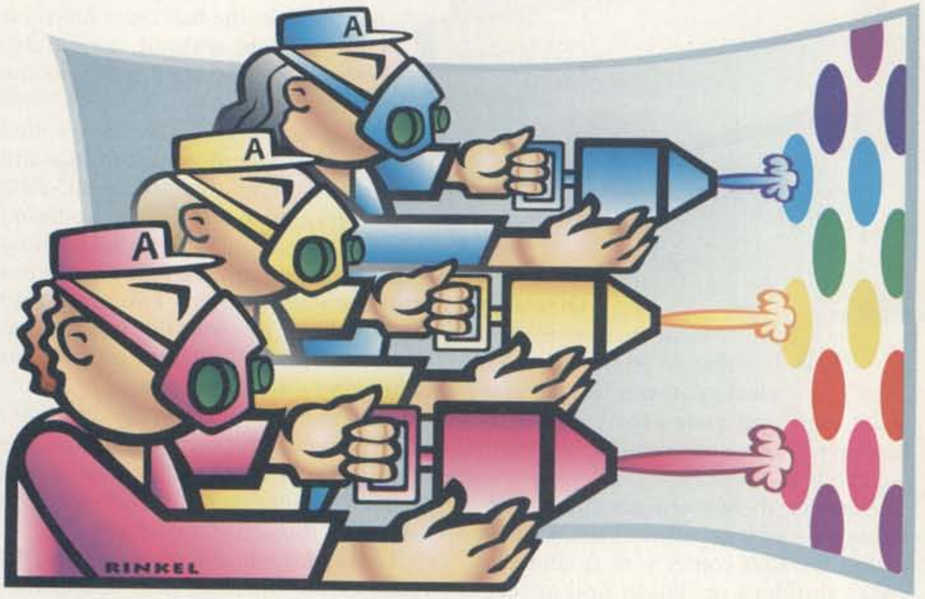
Make mine colour

Just a few years ago colour printing was far too expensive for the majority of people to contemplate. But by the end of last year A3-size colour printers (and a couple of the models reviewed here can even print up to A2 size) were available for less than $2,000, and there are now several models shipping for under $1,000.

As one would expect given the relatively low prices, these new A3 colour printers all use inkjet technology, rather than laser or dye-sublimation. But the once-humble inkjet is increasingly providing a real alternative to these expensive options (see *APC* March, page 132, for more on printer technologies.) Professional designers would once have scorned inkjets as being unable to match the quality provided by the more expensive technologies. However, that's much less of a consideration than it used to be, because while prices have been falling, the quality available from inkjets has risen remarkably.

To get the best out of these printers, you'll need to use an appropriate coated, glossy paper that's been specially designed for inkjets. Then set your printer to the highest quality option available — which means using not only the highest possible resolution, but also the printer's proprietary image enhancement technology. And as long as your original is of a high quality, you will be astonished by the results. Indeed, if you took your printout and hung it in your hallway, most visitors would need to look very hard to tell that it wasn't a photo.

However, such high quality does come at a price — A3 colour inkjets are nowhere near as fast as comparable lasers. A professional design studio would find these printers wholly inadequate because of their throughput. But as long as you don't need to print hundreds of full-colour A3 pages a day, an inkjet may well be worth considering. Their quality makes them ideal for presentations and mock-ups, or simply for adding a splash of colour to standard documents. And their ability to print large formats allows them to produce wall charts, posters or simply A4 documents with a design that bleeds off on all sides.



The other drawback to inkjets, apart from their relatively slow speed, is the cost of their cartridges. The inkjet process gradually wears out the print head (the nozzles which squirt the hot ink onto the page), so the manufacturers all include a new head as part of a new ink cartridge. But while that ensures continuing high quality, it does make the cartridges expensive, often as much as $30 to $40 each.

Meanwhile, the increasingly high resolution offered by inkjets tends to exacerbate the cost problem. At 360 by 360dpi, a printer must lay down more than 100,000 drops of ink per square inch to print a solid colour, but at 1,440 by 720dpi (the highest resolution currently available) that number leaps to over 1 million drops per inch — a staggering tenfold increase in the amount of ink consumed. Obviously, all these printers have draft modes which are faster and more economical. But if it's eye-popping quality you need, you will have to bear in mind the cost of consumables.

The other aspect to cost is the specially-coated inkjet paper, which is significantly more expensive than ordinary paper (especially for A3 sheets). It's also worth noting that even with the special paper, we found all these printers tend to wrinkle the sheets slightly, especially when producing large areas of solid colour. Once the ink has thoroughly dried you can press the sheets to smooth them out again, but all this adds to the time it takes to produce your urgent mock-up or presentation.

We tried testing all these printers on standard 80gsm (grams per square metre) office bond, but the results were uniformly atrocious, as the inks tend to bleed into the paper and spread, so that all the images looked smeared and fuzzy. There's not much point in paying for a high-quality printer and then ruining the results with a low-quality paper, so check out paper costs before deciding which kind of printer to buy.

However, with all that in mind, A3 colour inkjets offer unparalleled quality for the price. So which is the best one for your needs?

BJC-4650

CANON

The Canon BJC-4650 printer came with excellent documentation, which makes it more suitable for a home user than any of the other printers. The first thing we found upon opening the box was a poster-sized, step-by-step installation guide, which starts with an illustrated packing list and then takes you through both hardware and software setup. This is an ideal approach for inexperienced users and more expert users may find they never need to consult the manual at all.

However, there is one potentially confusing issue for inexperienced users, which is that the unit comes with a choice of either standard or 'Photo Colour' cartridges. But the easy install guide doesn't explain the difference — you will need to check the manual. Users who do consult the manual will find it extremely well designed and organised. Like the BJC-5500 documentation, the BJC-4650's guide is supplemented by plenty of clear illustrations and useful notes and tips, all well distinguished from the main text.

Unlike the other Canon printer reviewed here, this one came with drivers on CD and floppy disk, which included Windows 3.1, Windows 95 and Mac software, but nothing for NT or OS/2 users. This printer also shared with its stablemate the problem of being Plug and Play (PnP)-compliant, but not documenting the fact. However, in this case the problem may prove slightly more confusing, since if you insert the CD when Windows 95 prompts you for a driver disk, the CD will auto-play and offer to start its own custom set-up program. But if you then exit the Canon set-up routine, Windows 95 will not be able to find the files it needs on the CD without your assistance. By contrast, Canon's installation routine is easy to use and works well, but it would have been even easier if Canon had advised users to start Windows with the printer switched off (so that it's not auto-detected) and to then run the CD-based installation routine.

Once installed, the Windows 95 driver is virtually identical to the one supplied with the BJC-5500 and provides the same comprehensive range of easy-to-use features. Among these is an image smoothing option, a print-enhancing feature. Somewhat surprisingly, we found that on most images smoothing made very little difference to the print quality, but added considerably to the print times. In light of this, the test times given on page 112 are without smoothing, even though this is technically not the best possible quality.

The main test page was printed using the standard colour cartridge and was every bit as good as the BJC-5500 when it came to fine details, producing sharp type and good solids with strong colour. Interestingly, we noted much less difference between the enhanced and draft-quality prints with this printer than with the BJC-5500. The most obvious change was that the colour accuracy declined visibly at the lower quality, with greys becoming noticeably pink, but the fine grids and type quality were almost unchanged; they suffered much more on the draft setting on other printers.

The photos, which we printed using the Photo Colour cartridge, were disappointing by comparison, coming up rather dark and murky, with poor definition and colour accuracy. These problems may have resulted from this being a prerelease model or possibly from a faulty cartridge, since the photographs printed with the standard colour cartridge were slightly better. Whatever the reason, we were unable to improve the printouts in the testing period available.

Distributor	Canon
Phone	(02) 9805 2000
Price	$799
Online	http://www.canon.com.au
In short	Very competitively priced, but while the graphics were great, the photographs were not as good.

Editor's Choice apcmag

EDITOR'S CHOICE

- **Epson Stylus Photo EX**

There are really no duds among this batch of printers; each has particular strengths which would make it suitable for a specific job. But if you want the best possible quality, particularly for photographic images, then the Epson Stylus Photo EX is the winner, particularly considering its $899 price tag.

However, it was the slowest printer in our tests. So if speed is your main concern, the Hewlett-Packard DeskJet 1120c is a better choice, and budget-conscious buyers may prefer the Canon BJC-4650's $799 price tag.

BJC-5500

CANON

Compared to the HP machine, the Canon BJC-5500 has a lot more paperwork in the box, which makes setting up and configuring the printer slightly confusing because it is not immediately clear which manual you should read first. However, once you've identified the main user manual, it does include a clearly-illustrated packing list, making it easy to unpack and set up the printer. The manual claims that a parallel cable is not supplied, but there was one included with the review model, so check what's actually in your box before you buy a separate cable.

Canon's documentation is excellent. The various alerts, notes and tips were clearly highlighted to ensure that readers notice them. The printer's instructions were extremely complex and detailed, which makes the manual rather intimidatingly thick, but that's somewhat unavoidable when a printer has so many features and options.

Unlike all the other printers reviewed here, the BJC-5500 will accept either cut sheets of paper, or a tractor feed (continu-

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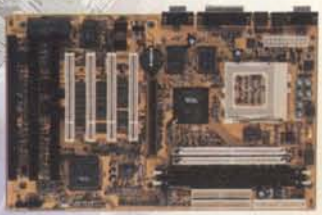
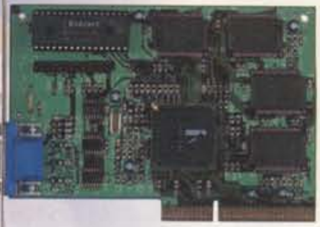


MVP 8597

DSV 5366



DVT 5200

DSV 5366

Advanced video capabilities and "Business-Ready" 3D Graphics.

- S3 Trio 3D chipset coupled with AGP architecture
- 128-bit 2D graphic engine
- 4MB SGRAM on board
- 230MHz RAMDAC Speed
- MPEG2/DVD playback
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- High Quality video manipulation

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Unique HyperPipelined 3D architecture, powerful 2D and video acceleration for the mainstream PC users

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- ACPI Compliant
- NTSC and PAL TV-Out Support

DVT 5200

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- Rendition Verite2200 chipset coupled with AGP architecture
- 4MB or 8MB SGRAM
- Motion compensation for software
- DVD/MPEG2 playback
- Supports full screen scalable video playback

MVP 8597

- VIA Apollo VP3 chipset V2.1 Compliant
- Supports all Socket 7 CPUs including MMX
- 65/75/83MHz CPU external bus speed
- 1xAGP & 4xPCI & 3xISA slots
- 2xDIMM & 2xSIMM slots
- ATX Form Factor

MVP 7598

- VIA Apollo MVP3 chipset V2.1 Compliant
- Supports all Socket 7 CPUs including MMX
- 65/75/83/100MHz CPU external bus speed
- 1xAGP & 3xPCI & 3xISA slots
- 3xDIMM slots
- AT Form Factor

MAL 8621

- ALI Aladdin Pro chipset
- Intel Pentium II Processor Slot 1: Operating at 233~450MHz
- 65/75/83/100MHz CPU external bus speed
- 1xAGP & 4xPCI & 3xISA slots
- 3xDIMM slots
- ATX Form Factor

MGX 7520

- All-In-One motherboard
- Cyrix GXm Processor, integrated x86 Solution with MMX Support
- Processor speeds offered up to 233MHz
- 4xPCI & 1xISA slots
- 2xSIMM & 1xDIMM slots
- AT Form Factor

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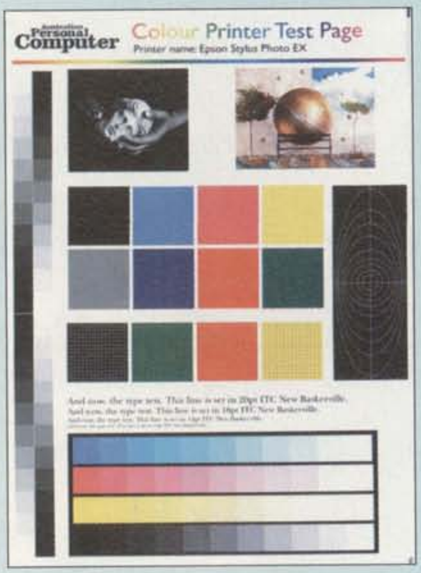
How we tested

For each of the printers we assessed three major factors: installation, speed and print quality.

Installation covered: the clarity of the instructions; the ease with which the various components can be identified and connected; and the software installation. A well-illustrated list of what was in the box, together with something that made it obvious where to start when setting up were both considered important. Printers lost points if their instructions were confusing or badly designed, or if the actual setup didn't follow the printed instructions.

Print speed was assessed by timing the printers with a suite of test files created with several different applications. Test files included A3 and A4 images from Adobe Illustrator 7, various photographic images from Adobe PhotoShop 4, and black text from Microsoft Word 97. Each printer was timed several times as it printed each test file and then comparative tests were done using several different quality settings.

Most of the printers offer a wide range of settings with complex colour calibration and other adjustments, but to keep the testing procedure manageable we used the highest quality setting available, the lowest quality (fastest speed) and an intermediate setting. Average results are given in the table on page 112. It should also be noted that the slow print times for the A3 test image reflect complex graphics we wanted the printer to process and produce.



Australian Personal Computer

Colour Printer Test Page

Printer name: Epson Stylus Photo EX

And now, the type test. This line is set in 20pt ITC New Baskerville.

And now, the type test. This line is set in 16pt ITC New Baskerville.

Print quality was assessed by comparing each unit's output from the various test applications. Particular attention was paid to the main test file, which included several graphic elements. This is a deliberately difficult test, since most printers can be optimised either for graphics or photographs, but not both. Black-and-white and colour photos were assessed on the fineness of detail, smooth transition between colours or tones, and on their colour accuracy. Black text and solid colours were included to assess how well each printer could reproduce both fine detail and well-saturated solids, without banding or other artefacts.

Stepped bars of different tints were included to test how well the printer held the different tints, how smooth the various shades were and whether or not the machine could successfully reproduce a 5% tint of each colour. Fine grids in different colours on various backgrounds were also used, since these usually prove difficult for most printers to reproduce. Points were deducted for uneven backgrounds or gridlines that either thickened or filled in.

Fine white circles and ellipses on a black background were used to test whether the ink bled into the paper and also whether images were distorted during printing. Generally, printers scored well for producing crisp images without bleeding or distortion and for holding fine detail. They lost points if fine lines filled in, pale tints disappeared or if images showed obvious banding or stepping.

Finally, we gave minor consideration to other aspects of the units, such as overall size and quiet operation.

ous paper). You can purchase up to two additional automatic feeders for cut sheets up to A2 size. Each bin holds as many as 100 sheets of A4 paper, or 10 envelopes or 50 transparencies. However, we found that they will only hold a single sheet of glossy, photo-quality paper at a time — any more than that and the feeder will jam. This limitation would be annoying if you needed to use glossy paper regularly.

Rather surprisingly, the printer software was supplied on floppy disks only, which may explain why there were only Windows 3.1 and Windows 95 drivers and nothing for Windows NT, Mac or OS/2 users (however, many additional drivers can be downloaded from Canon's Web site).

Like all the other printers in this review, the Canon is PnP-compliant, but the supplied installation instructions for Windows 95 make no mention of this. Nonetheless, inserting the driver disk when Windows 95 asked for it installed the printer without problems. It is curious, though, that Canon's manuals don't mention the fact that the printer can be installed this way.

The Windows 95 printer driver, which we used for our tests, has an excellent range of well-designed features which allow you to control every aspect of the printer's operation from your PC. The only additional feature that might have been useful would have been a print preview option (such as the HP driver has).

Once the software is installed, the printer is ready for use — there is no initial software-based set-up routine as with the HP. The printer is slightly larger than the HP, which is not surprising given that this model will print up to A2 size. We also found this unit slightly noisier than any of the others, but not loud enough to present any real problems in most work environments.

The Canon BJC-5500 is intended mostly for CAD-type work and is well suited to that role, as its print sample made clear. The fine grids came up razor-sharp, as did the type, and the printer had no difficulty holding a 5% tint of any colour. However, while the white-on-black ellipses were significantly better than the HP's, they were still slightly uneven, with portions of each arc being thicker or thinner. Solids were excellent — very even and strongly coloured — but the photo quality was disappointing. In the black-and-white photo the highlights were rather bleached out, and the colour pictures slightly wishy-washy.

■ **Distributor**	Canon
■ **Phone**	(02) 9805 2000
■ **Price**	$1,499
■ **Online**	http://www.canon.com.au
■ **In short**	A near-perfect printer for users who want to print complex, detailed graphics or vibrant solid colours, but not the best choice for photographic images.

Stylus Color 1520

EPSON

Despite the clear instructions that came with the Epson Stylus Color 1520, we had a few problems setting it up. The diagram showing how to attach the feeder tray was ambiguous and once the input feeder is attached, it is partly obscured by the output tray, which sits just above it. This arrangement makes it tricky to set the paper width guides when you change paper sizes. Similarly, we found that the sequence for inserting the ink cartridges didn't initially work as it was supposed to, but after a few attempts we got everything installed and working properly.

The 1520 took much longer to warm up than the other printers we tested, and it performed an extensive (and rather noisy) set of self-testing and self-cleaning routines in the process. Despite all this we had to clean the print heads several times before we got a clean, even-coloured print out of the machine.

After the problems we had with the hardware, the software installation was straightforward. The manual clearly explains that the printer is PnP-compliant and that you have a choice of either installing the drivers using the PnP option, or you can leave the printer switched off and run the installation routine from the disk supplied. Our review model only came with floppy disks containing Windows 3.1 and 95 drivers. Presumably the unit normally ships with a CD containing additional drivers, since the manual refers to a CD and contains instructions for Macintosh-driver setup.

The Epson Windows 95 driver was one of the best we tested. It includes either automatic or advanced options: in automatic mode you simply have a slider control that selects between best quality and best speed or any point in between; advanced mode gives you complete control over each of the printer's many features, including the ability to save and reuse a particular combination of settings.

Image quality was generally excellent, which is to be expected given the unit's maximum 1,440dpi resolution. Naturally, such high resolution comes at a cost — this was the second slowest printer we tested. However, we found that speed increased very markedly as we dropped the resolution and the loss of quality was fairly minimal, thanks to Epson's proprietary image-enhancement technology.

Graphics quality was very good, with the white on black ellipses printing without the variation in line width that the other printers showed. However, the solid colours were over-saturated so that the process magenta was almost as dark as the red (100% magenta plus 100% yellow), instead of being a distinctly lighter, pinker colour. Nevertheless, the photo quality was superb, producing richer, more accurate colours than the HP printer, with no loss of contrast or detail.

■ **Distributor**	Epson
■ **Phone**	(02) 9903 9000
■ **Price**	$1,799
■ **Online**	http://www.epson.com.au
■ **In short**	An excellent printer — but expensive.

Stylus Photo EX

EPSON

This was the easiest printer to set up because there's almost nothing to do: you simply clip the support for incoming paper onto the back of the printer and pop the cartridges in. Software installation is equally straightforward, with the same choice between PnP or custom installation as offered by the Epson 1520. The printer software came on CD only (but includes a utility to make floppy disks from the CD if you need to), and included drivers for Windows 3.1, 95 and NT as well as Macintosh drivers. Poor old OS/2 users are once again ignored.

The software installation ran flawlessly. The Windows 95 driver is very similar to that supplied with the 1520 and includes a faster/better slider control. Another useful feature of the Epson driver is that when you send a file to print, a little pop-up dialog box appears which shows you how much of your file has printed and gives a rough estimate of how long the job will take to finish. The printer software also includes Epson's own version of the Windows spool manager, which provides information such as how many jobs are in the queue.

The Photo EX was one of the most compact units we tested, especially when its paper trays are folded up, and it was also fairly quiet in operation. However, it was the print quality that really distinguished this printer from the others. While it was generally very similar to the other Epson, there were a few improvements.

Photographs printed very cleanly with good definition and excellent contrast, and we were especially impressed with the colour accuracy. It was also noticeable that tints of black printed in a very neutral grey, without any warm or cold cast to them; this in turn made the printer's rendition of black-and-white photographs very impressive. Rendering of various tints was generally very good. In fact, it was the only printer able to clearly render the difference between solid yellow and a 90% tint of yellow. The only minor flaw in Photo EX's results was that, like the other Epson, its magenta solids were rather too red. Fortunately, this did not produce any reddish cast in photo rendering.

As mentioned above, high resolution comes at a price, notably in increased ink consumption. The Epson status monitor utility not only shows the progress of print jobs, but also the amount of ink remaining in the cartridges. At the highest resolution the reported ink level had dropped visibly after only a few pages. It must also be acknowledged that the Epson was the slowest printer in our tests — again because of its high resolution — but it speeds up quite impressively without too much loss of quality as the resolution is dropped. Nevertheless, given its price, the Photo EX represents astonishing value for money.

■ **Distributor**	Epson
■ **Phone**	(02) 9903 9000
■ **Price**	$899
■ **Online**	http://www.epson.com.au
■ **In short**	Excellent quality at an excellent price, but print speed decreases with higher resolution.

DeskJet 1120c

HEWLETT-PACKARD

Setting up the Hewlett-Packard DeskJet 1120c printer and installing the ink cartridges proved entirely straightforward. The software was supplied on a CD and floppy disks, and included drivers for Windows 3.1, 95 and NT. We tested the CD-based installation for Windows 95 and were impressed by its slick design and ease of use.

After the HP software is installed, you need to run a program for aligning and cleaning the print heads. There is no message onscreen to tell users that the test is happening, or when it's over. Apart from those details it worked well and we were able to start printing without further delay.

The printer was supplied without a parallel cable, which would need to be purchased separately, but was otherwise complete and well packed. The installation information consisted of a single booklet with clear, step-by-step instructions.

The printer driver gives excellent access to all the printer's features, but we found that one or two of them — such as the ability to automatically fit an image to a page — did not work properly with all our test applications. The other very minor problem with the driver was that it alerted us to the fact that we had selected the wrong size of paper for our test image *after* printing, rather than before. The unit is fairly quiet in operation, producing only a steady 'panting' sound while printing.

The HP's overall image quality was slightly disappointing: solids were even, but slightly lacking in colour intensity, particularly in the red (100% magenta plus 100% yellow), which looked rather orange. The light-coloured grids on coloured backgrounds all filled in and the type came up looking slightly bolder than it should. However, the printer retained most of the 5% tints, and the photos came up fairly well, with good colour saturation and accuracy. As mentioned in 'How we tested', most printers produce their best results when printing either graphics or photos, rather than a combination. So if, for example, your work consists of mainly graphics, this printer could be adjusted to give better solids than in our tests.

Distributor	Hewlett-Packard
Phone	131 347
Price	$970
Online	http://www.hp.com.au
In short	The fastest printer and one of the cheapest, but also the lowest overall quality.

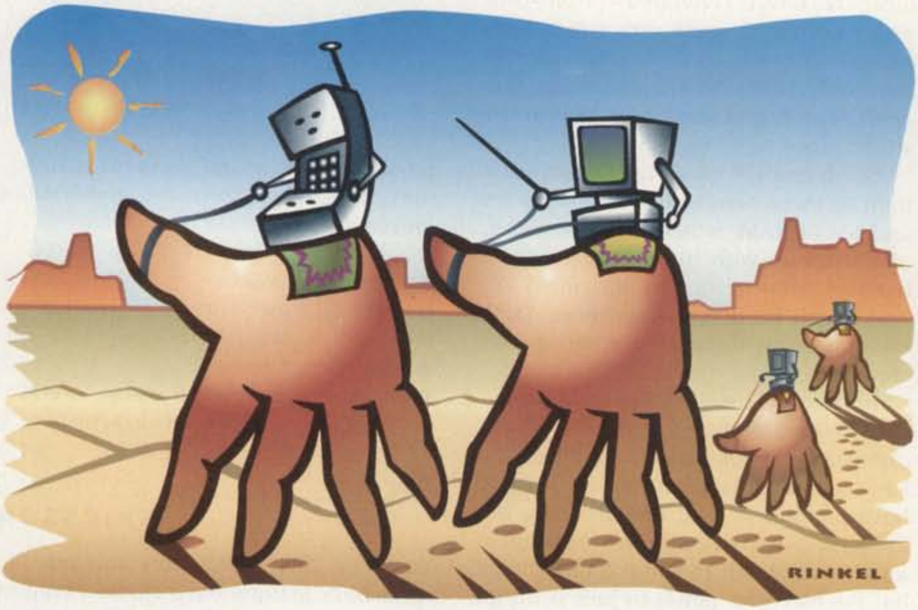
Results and specifications: A3 colour printers

Product	Canon BJC-4650	Canon BJC-5500	Epson Stylus Color 1520	Epson Stylus Photo EX	Hewlett-Packard DeskJet 1120c
Distributor	Canon	Canon	Epson	Epson	Hewlett-Packard
Phone	(02) 9805 2000	(02) 9805 2000	(02) 9903 9000	(02) 9903 9000	131 347
Online	http://www.canon.com.au	http://www.canon.com.au	http://www.epson.com.au	http://www.epson.com.au	http://www.hp.com.au
Price	$799	$1,499	$1,799	$899	$970
Maximum resolution	720 by 360dpi	720 by 360dpi	1,440 by 720dpi	1,440 by 720dpi	600 by 600dpi (for black and white; no spec for colour)
Maximum paper size	A3	A2	A2	A3	A3
PostScript option and cost	No	No	Yes, $499	Yes, $499	No
Size (W by H by D) (mm)	447 by 253 by 216	600 by 196 by 364	666 by 202 by 504	546 by 172 by 262	579 by 223 by 380
Weight (kg)	4.3	9.7	15	7	9.4
Time taken to print A3 test page using Adobe Illustrator 7 on best quality (min:sec)	19:16	16:24	21:28	29:28	11:27
Time taken to print A3 test page using Illustrator 7 on lowest quality (min:sec)	7:53	8:01	4:25	5:26	5:59
Time taken to print A4 colour photo using PhotoShop 4 (min:sec)	9:24	6:42	7:38	7:02	5:32
Time taken to print 3-page A4 test document using Microsoft Word 97 (min:sec)	3:11	2:33	1:29	1:33	1:19

All specifications are supplied by manufacturers.

Hand it over

Smaller, faster, smarter, more compatible. Are the latest handheld gadgets viable solutions for the mobile user? **By Jeremy Torr**



The personal computing devices (PCD) market is experiencing a boom, with dozens of new products emerging every few months. Best of all, prices of the current generation have dropped dramatically: 30% to 40% reductions on last year's prices are not uncommon.

Last year we were assured that Windows CE was the PCD future, but it looks as though the small-footprint Win OS has been less dominant than Microsoft intended. Despite the number of models on offer, users still seem happy to pay extra for a full Windows notebook option, rather than the cut-down CE systems. Meanwhile, the 3Com PalmPilot with its proprietary OS claims 70% of the US personal digital assistant (PDA) market. Low cost coupled with foolproof operation and decent battery life have seen this device succeed. Both Sharp and Texas Instruments have produced clone PalmPilots, and there are rumours that Casio is about to follow suit.

But the big glow on the horizon comes not from the actual units, but the connectivity issues surrounding them. The PalmPilot (or at least the new Palm III, which has infra-red communications) will have to try to keep the flood of new phone-equipped PCDs (such as the GSM-ready Sharp MC-G1 and LG PhenomGSM) at bay, as well as fight off the next wave of Windows Palm PCs, such as the Casio E-10, which combine the PalmPilot's dimensions with CE capability.

Any PCD should have an advantage over notebooks and desktops in terms of instant access to the onboard data.

Other areas of progress include more legible colour screens, larger keyboards, faster CPUs, more memory and voice capability. Battery power has been increased with the use of NiMH and lithium ion rechargeables, but this has been countered by increased speed and CPU power demands and bigger, more colourful screens. In many cases, this extra power has also come at the expense of convenience, as some units now demand custom battery packs instead of readily available AA-style alkalines. This has also led to increases in the size and weight of many of the CE machines. The use of touch-screen controls is now almost a standard, but the demands of accurate icon double-tapping are not to be dismissed; it can be very frustrating if the interface is not extremely well designed, given the small screen sizes.

When looking for a PCD, make sure it is what you need. The ability to log onto email or existing networks, regardless of OS, seem paramount. After size and weight, this is the biggest priority — otherwise a simple personal organiser will fit the bill at less cost. Most buyers are likely to use the unit for keeping up to date with centralised data. If you need to do lots of data processing on the move, a notebook makes more sense.

All the units we looked at link easily with a host machine and exchange data in various formats. Whether or not these formats suit your workplace is another important consideration: for example, the Avigo uses Lotus Organizer, so if you use Outlook in the workplace, the big connectivity advantage suddenly disappears.

Third-party support is also important. Spending several hundred dollars on a unit for which you can't buy extra software is a bit silly. And check out the cost of upgrades, too: standard-format memory cards usually cost significantly less per megabyte than proprietary memory. Lastly, any PCD should have an advantage over notebooks and desktops in terms of instant access to the onboard data. One-key access, instant paging through lists, and fast file loading are a must. Any device that demands multiple tiny key presses, lots of stylus-clicking, or keyword entry to perform simple tasks are a nuisance when you are trying to get that all-important phone number or costing information.

None of the units we reviewed are capable of replacing the desktop or notebook, only of extending their reach. Having sophisticated apps on a device incapable of running them easily is not realistic. Having a quick and simple electronic scratchpad (almost like a disposable diary) is, and this is where PCDs excel.

So, until voice recognition comes in pocket-sized units, don't expect your PCD to solve your mobile computing problems — you could be disappointed if you do.

Cassiopeia A-11A Super

CASIO

The Cassiopeia was one of the first Windows CE pocket machines on the market, and the latest version echoes the original no-frills product. Its physical attributes haven't changed — same two-finger keyboard, same dim screen with irksome contrast control, same annoying backlight auto-off just when you don't need it, and same IrDA port in the wrong place.

But in terms of value, the Cassiopeia is right up there. Now with Windows CE 2.0 and 6M of RAM, it is faster and slicker, plus it comes with the best selection of bundled software of any handheld PC. And it sells for a very competitive $599, which is below the price of many pocket organisers.

In use, the Cassiopeia is very logical — On/Off key, standard keyboard layout and plug-in serial cable as supplied. The key layout is quite cramped, and so backspacing, paging and deleting are fairly tricky manoeuvres. The inclusion of an alarm light on the lid is a nice touch, but the lack of a power-in jack is disappointing.

Other ports include a standard IrDA, and a PC Card slot — although the latter is likely to really sap the batteries if used, especially as no AC option is supplied, which is not good if extensive Web surfing is on the menu. Nonetheless, given the proven durability and standard facilities, the Cassiopeia still offers reasonable value and capability.

Distributor	Mobex
Phone	(02) 9370 9100
Online	http://www.casio.com
Price	$599
In short	Cheap price is offset by lack of AC power and some tricky controls.

MC-12

ERICSSON

Based on HP's 320LX, this unit has the same basic features but includes a built-in GSM modem and dedicated software. This means the user can connect directly to a compatible Ericsson phone using the supplied cable and then, using the built-in MyPhone application, dial out using voice, fax or data. No PC Card or external modem is required. The system supports email, Web browsing and direct voice calls, but no fax application is supplied.

The Windows CE 1.0 OS makes this unit comparatively slow compared with the Version 2.0 units now on sale, and the MC-12 only includes 4M of RAM, which doesn't add to the speed, especially when downloading graphics. The case is slightly darker than the HP original, but has identical keys and stylus, and a reasonable 640 by 240 screen with green backlighting. The addition of an IrDA port is useful, as any cable data exchange quickly flattens the batteries.

The MC-12 doesn't come with a docking cradle, just a serial PC host connecting cable. But to make up for this, the pack includes a quality leather case/organiser pouch and a 2M CompactFlash card primarily for back-up purposes. As an adjunct to an Ericsson phone, it is a very neat and cost-effective GSM solution. As a Windows CE device, it is a bit slow.

Distributor	Ericsson
Phone	1300 650 050
Online	http://ericsson-mobiles.com.au
Price	$899
In short	Neat, cheap and versatile mobile solution, but aging slightly.

HP 360LX

HEWLETT-PACKARD

The 360LX is HP's step up from the original 320LX, with a different screen and more RAM. Otherwise it is physically the same. The new screen has a white backlight instead of green, but without any legibility increase. The extra 4M, together with the Windows CE 2.0 OS, makes things noticeably quicker, but the keyboard is only really suitable for hunt-and-peck typing.

The docking cradle still mainly serves to take up space. Our advice is to junk it and keep the serial cable. There are extra touches on the new model, such as a slight rounding on the case and a couple more demo apps, but overall, the hardware and software are the same.

Rather strangely, all the system ROM and RAM (now 8M) comes on the slot-in memory card. This means if you want to upgrade, you have to throw away the existing ROM/RAM before adding a new card.

Other expansion options include a standard Type II PC Card and CompactFlash slots. Interfaces consist of the host serial connector and an IrDA window. When compared with similar CE units, the 360LX is a bit costly given its performance and bundled software.

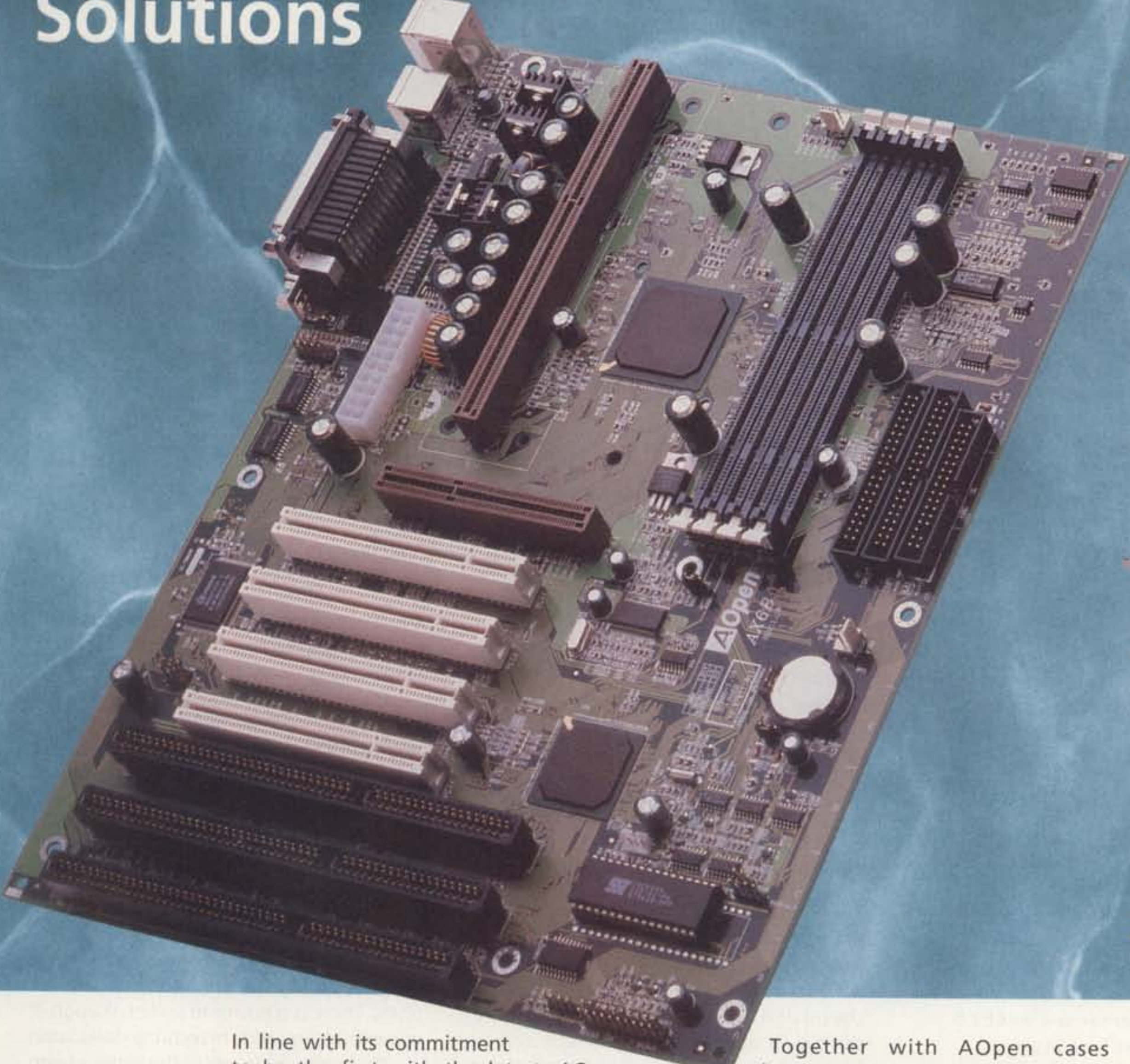
Editor's Choice apcmag

EDITOR'S CHOICE

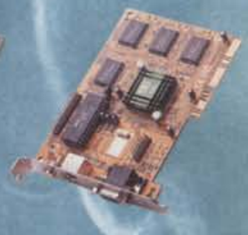
- **3Com PalmPilot Professional**
- **Ericsson MC-12**

In terms of PDAs, the Pilot is still just ahead of the pack. It is fast, power-miserly, email-empowered and simple enough for anyone to use. Plus, there is no annoying pretend keyboard. But if you want the direct connectivity and compatibility the Windows CE machines offer, it has to be a shoot-out between the Sharp Mobilon, which includes a voice recorder, and the excellent value of the Ericsson MC-12 and its built-in GSM modem. Given the bargain price and suitability for road use, the Ericsson just clinches it. Pilot or MC-12, take your pick. We can't decide.

Total Component Solutions



AOpen 36x CD-Rom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AOpen AW35 Sound Card

AOpen HX45 Midi-Tower

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ACT: The Logical Approach (02) 6251 6511 **VIC:** CANDA (03) 9574 9760 • Omega Computers (03) 9800 3444
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How we tested

In this roundup, we looked at PCD capabilities such as portability, usability and connectivity, as well as cost. Each unit was compared with the rest of the sample to give a price benchmark, and this was weighted to cover hardware and software inclusions.

The ideal pocketable dimensions of the Avigo and Pilot were used as a benchmark to measure portability, along with practical considerations such as one-hand operation if required. Usability was gauged on the ease and speed of linking to the host as well as the quality of host software, the ability to quickly add or correct data (always an issue with tiny keyboards on clamshell format units), and the likelihood of the power running out mid-session.

Issues such as screen legibility, the ability to upgrade, standard expansion capacity, and extras such as voice or built-in modems were also taken into account. The overall assessment was made on the basis of the PCD as a data port for a larger system, not as a notebook replacement.

Distributor	Hewlett-Packard
Phone	131 347
Online	http://www.hp/handheld
Price	$1,260
In short	Solid performer in the CE 2.0 bracket, but a bit pricey.

HP 620LX

HEWLETT-PACKARD

This is HP's handheld PC flagship model, and it's done a good job with it. It certainly isn't cheap, but you do get a lot of go for just under $2,000: a 75MHz Hitachi RISC chip, 16M of RAM, 10M of ROM, built-in voice recorder, a keyboard you can almost type on, lots of bundled apps and a really impressive colour screen.

The 620LX boasts stylish silvery buttons on a black case, a pop-out stylus, a designer docking cradle and even a NumLock key. Other useful extras are hard icons: preset function keys that call up embedded apps such as Word, Calendar, and so on, direct from the keyboard. These allow multiple apps to be instantly opened, which is very useful.

Expansion is in the form of a PC Card slot and CompactFlash slot. The battery is a proprietary lithium ion unit, so you need the power supply wherever you go. Battery life on our test was around four hours' continuous use, which isn't that brilliant, especially if using a comms card. The voice recorder was adequate but not as clear as the Mobilon; more a gadget than a useful tool.

Lastly, the unit is big. It is not that much smaller than the Libretto (see page 117) and is in no way a pocket device. But as an executive toy, this is the one to have.

Distributor	Hewlett-Packard
Phone	131 347
Online	http://www.hp/handheld
Price	$1,900
In short	A cumbersome and power-hungry unit.

Phenom H-120

LG ELECTRONICS

The initial appeal of this unit from LG Electronics is its shape. It has a much less rectangular case than the other reviewed products, and has a sleek chrome insert in the lid and flip-out legs at the rear. Due to the bigger case, it has an uncluttered keyboard which has a large, L-shaped return key. Despite this, it is not as easy as the Sharp to type on — the spacing is generous but the keys are small.

The screen is mid-range quality-wise, and the illuminated button is actually brighter than the backlight itself. The screen has a line of 'hard icon' keys along the bottom, but they don't activate the main apps, just applets such as clock and calculator. One of these is labelled 'voice', but it wasn't working on our pre-production review model, although a microphone and external 'record' button were in evidence.

The Phenom offers both CompactFlash and PC Card expansion, along with an IrDA port and DC-in socket. The serial port also offers VGA-out, but needs a special cable to do so. The Hitachi RISC CPU and 8M of RAM offered reasonable speed, but not to the same extent as that provided by the 620LX. The bundled apps weren't particularly impressive either — just PowerPoint as a bonus.

Distributor	LG Electronics
Phone	(02) 9888 1311
Online	http://www.lgeus.com
Price	Approx $1,399
In short	A fairly standard device, but needs voice recording to justify the price.

Mobilon HC-4100

SHARP

Sharp used to dominate the notebook market. Despite dropping the ball there, it is soldiering on in the handheld PC zone — and with good results. The Mobilon 4100 offers solid features, yet doesn't get carried away in the specification race at the expense of battery life. With a decent 8M of RAM, a 15MHz MIPS CPU, a 620 by 240 half-VGA backlit screen and genuine pocketable dimensions, it has all the basics.

In addition, it has a good voice recorder and the ability to use a PC Card camera for image grabbing — but as there is no power supply in the pack, you won't do this too often. There is a power-in socket, though, if you want to upgrade to rechargeables later.

The keyboard is one of the better examples of the bunch, and accurate typing is quite possible with two fingers. Like the 620LX, the HC-4100 offers 'hard icon' application selection for the main programs, and can also be used as a voice recorder when the case is shut and the unit powered off.

The usual alarm light, IrDA window and serial-out complete the outer casing, but there is no option to upgrade memory. Battery life was a reasonable 20 hours or so. Given its unpretentious yet capable nature, the Mobilon offers good value — it's just a shame the original internal modem isn't certified here.

Distributor	Sharp
Phone	(02) 9830 4600
Online	http://www.sharp-usa.com
Price	$999; $1,199 with power supply and NiMHs
In short	Good facilities, good design, good value.

Avigo

TEXAS INSTRUMENTS

Someone had to do it. The PalmPilot now has a clone. The TI Avigo looks so similar, it could be mistaken for the Palm III. But instead of using the original Graffiti stylus input system, the Avigo uses a pop-up LCD keyboard on which you tap keys with a stylus. This is both slow and silly — what is the point of a touch screen if you have to type on it?

Aside from that, the Avigo looks good. It has more standard apps than the Pilot, including a financial calculator, a sketch utility and the ability to re-orient the screen horizontally, which is useful if viewing spreadsheets. The unit comes with a serial link cradle plus IntelliSync and Organiser 97, so you can map data and link the unit to a host PC. But this approach detracts from the simplicity — it is nowhere near as idiot-proof as the Pilot's HotSync system. The screen is less clear than the Pilot's, but has a much better backlight and protective lid, and more intuitive page-up/page-down buttons.

Although it has an IrDA window, no host apps are supplied to work with it. There is a 1M expansion option, but no modem or email facility. As a Pilot clone, it is smoother physically, but not as good in terms of data input and exchange.

Distributor	Hot Products
Phone	(02) 9489 8788
Online	http://www.ti.com/organizers
Price	$599
In short	Looks streets ahead of the Pilot, but lacks the input and comms capabilities.

PalmPilot Professional

US ROBOTICS

It set the benchmark, and it is completely proprietary — but still the PalmPilot soldiers on. The Professional unit offers the same pocketable dimensions as the original, but now with more memory, a backlight, a built-in Excel-compatible expense calculator and email compatibility. Admittedly, this latter only accepts truncated emails from your host PC, but it can do this by modem or direct connection, or over a LAN. The snap-on PilotModem is available locally, but is not yet certified.

The PalmPilot recognises handwriting as set out by the Graffiti handwriting recognition system, where you must learn to enter letters by writing on the pad in a certain way. It works well enough once you get used to it, but isn't really suitable for more than rough jotted notes. All entries can be downloaded into the PC in ASCII format, then easily exported or imported into a whole range of applications. Battery life and legibility are both very good, and synchronisation via the supplied cradle is faster and smarter than most.

The Pilot's menu system and one-touch buttons for the main categories make it easy and quick to use, but the page-down buttons do include a few quirks; it is better to use the supplied stylus for most selection tasks. Despite these niggles, this is still the one to follow — until the Palm III is released.

Distributor	3Com
Phone	(03) 9934 8888
Online	http://www.palmpilot.com.au
Price	$629; Personal PalmPilot $429
In short	Does what it is designed to do well, and connects easily and reliably. Still (just) ahead of the pack.

Toshiba Libretto 100

What is only slightly bigger than the 620LX, boasts full Windows 95 with all the apps you want, a Pentium 166MMX with a 3.2G drive, 32M of RAM and a PC Card floppy to exchange data with the world? The new Toshiba Libretto. This tiny box of tricks has a better keyboard than most of the handheld PCs and completely avoids the need for a mobile halfway-house solution such as the Windows CE machines. It can cope with any full-scale applications you care to load, either via the supplied floppy or via any desktop parallel port using the supplied IntelliSync file transfer utility. Its main drawback will be price: it is expected to cost around $3,000.

The screen is a gem in the clarity stakes, and the mouse button on the lid just does the job if you don't want to do too much click and dragging. The original Libretto has been upgraded to include sound input via a built-in microphone as well as output via a tiny speaker, although neither offers what you could call high-fidelity quality. However, a decent set of multimedia input and output options, together with the bundled port replicator, make the operation of this miniature marvel as a stand-alone multimedia desktop quite feasible. The bundled port replicator allows direct connection to standard outputs with no delicate special-purpose cables required, and the unit includes an IrDA port for quick and dirty printing on the road.

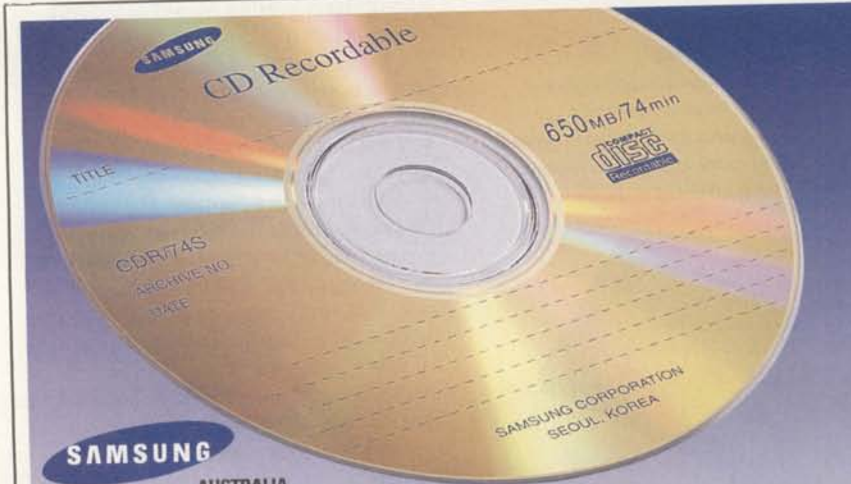
Specs include a Pentium 166MMX Tillamook processor, 32M of EDO RAM expandable to 64M, 2M of VRAM, 1,024 by 768 NeoMagic 128-bit video accelerator, 1.4M PC Card floppy, 3.2G EIDE hard drive, active matrix TFT 7.1in, 800 by 480-pixel colour display, and an 80-key keyboard. You will also find an IrDA window, sound-in and sound-out sockets, and one Type III or two Type II PC Card slots in this 210 by 132 by 32mm, 1kg package.

Results and specifications: Handhelds

Product	Casio Cassiopeia A-11A Super	Ericsson MC 12	Hewlett-Packard 360LX	Hewlett-Packard 620LX
Distributor	Mobex	Ericsson	Hewlett-Packard	Hewlett-Packard
Phone	(02) 9370 9100	1300 650 050	131 347	131 347
Online	http://www.casio.com	http://www.ericsson-mobiles.com.au	http://www.hp.com/handheld	http://www.hp.com/handheld
Price	$599	$899	$1,260	$1,900
Operating system	Windows CE 2.0	Windows CE 1.0	Windows CE 2.0	Windows CE 2.0
Screen	480 by 240 mono backlit	640 by 240 mono backlit	640 by 240 mono backlit	640 by 240 256-colour
Input	Keyboard, stylus	Keyboard, stylus	Keyboard, stylus	Keyboard, stylus, voice
Standard RAM	6M	4M + 2M	8M	16M
CPU	Hitachi SH3	Hitachi SH3	Hitachi SH3	75MHz Hitachi SH3
Expansion	PC Card	PC Card, CompactFlash	PC Card, CompactFlash	PC Card, CompactFlash
Batteries	2 x AA alkaline	2 x AA NiMH	2 x AA NiMH	12V lithium ion
Approx battery life	18 hours	20 hours	15 hours	4 hours
AC supply	No	Yes	Yes	Yes
Comms	Win CE serial, IrDA, camera	Win CE serial, IrDA, modem	Win CE serial, IrDA	Win CE serial, IrDA
Applications*	Migrate, bFax, pcAnywhere, Courier	MyPhone, Phone Book	bFax, Month@glance, Financials, PowerPoint	bFax, Month@glance, Conversions, Expensable, bFind, PowerPoint
Sound	Speaker	Speaker	Speaker	Voice recorder, speaker
Size (mm)	265 by 175 by 92	183 by 94 by 29	183 by 94 by 29	198 by 104 by 36
Weight (g)	380	442	457	586

Product	LG Electronics Phenom H-120	Sharp Mobilon HC-4100	Texas Instruments Avigo	US Robotics PalmPilot Professional
Distributor	LG	Sharp	Hot Products	3Com
Phone	(02) 9888 1311	(02) 9830 4600	(02) 9489 8788	(03) 9934 8888
Online	http://www.lgeus.com	http://www.sharp-usa.com	http://www.ti.com	http://www.usr.com.au
Price	Approx $1,399	$999	$599	$629
Operating system	Windows CE 2.0	Windows CE 2.0	Avigo Manager	Pilot OS
Screen	640 by 240 mono backlit	640 by 240 mono backlit	16 by 240 mono backlit	160 by 160 mono backlit
Input	Keyboard, stylus	Keyboard, stylus, voice	Stylus	Stylus (Graffiti)
Standard RAM	8M	8M	1M	1M
CPU	Hitachi S3	MIPS R400	Texas Instruments	Motorola RISC
Expansion	PC Card, CompactFlash	PC Card	1M	1M
Batteries	2 x AA NiMH	2 x AA alkaline	2 x AAA alkaline	2 x AAA alkaline
Approx battery life	20 hours	20 hours	4 weeks	4 weeks
AC supply	Yes	No	No	No
Comms	Win CE serial/VGA, IrDA	Win CE serial, IrDA	PC Link	HotSync
Applications*	PowerPoint	Camera, voice and image editor, bFax	Sketch, IntelliSync, Lotus Organizer 97	Expenses, Email
Sound	No	Voice recorder, speaker	Beep	Beep
Size (mm)	194 by 109 by 29	186 by 93 by 26	140 by 83 by 20	120 by 80 by 16
Weight (g)	460	410	198	162

*All units include address, memo, calendar and to-to lists. Windows CE units include Windows CE, Pocket Word, Excel, Explorer, Scheduler and Calendar.



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THE POTENTIAL FOR ELECTRONIC COMMERCE AS A REVENUE EARNER IS WIDELY DISCUSSED — BUT HOW USEFUL AND HOW EASY IS IT FOR SHOPPERS?

Shop 'til you drop

By Selina Mitchell

Electronic commerce (or ecommerce) is a '90s buzz word. Even Australia's conservative Prime Minister believes it to be the direction of our purchasing future, and a way to increase the nation's economic bottom line. The potential for companies to earn money through Internet sites is widely discussed and predicted, and many governments are transferring basic services to the Net.

Over 100,000 Australians purchased products via the Internet in 1997, and this number will increase to 1.1 million in 2001, according to IDC's Internet analyst, Tim Sheedy. On average, each of these consumers spent about $548 online in 1997. That amount should increase to $1,250 in 2001, said Sheedy.

Most of the $US4 million worth of daily shopping activity so far on the Net around the world is concentrated on products that are easy to distribute: items that can be downloaded, such as software, or mailed, such as books, CDs and PCs. There is not much take-up of other consumables or high-value goods, said Bruce McCabe, an analyst with the Gartner Group, and this is not likely to change in a hurry. "You can't try on clothes or test-drive a car on the Internet." He added that there were still a large number of consumers without access to the Internet. There are 2.48 million households in Australia that own PCs (about 37%), and only about 10% of male and 5% of female PC users access the Internet. About 20% of Net users are willing to buy online, according to the latest ABS survey on the household use of IT.

In its report *Retail Revs Up*, Forrester Research predicted late last year that online shopping will eventually become a mainstream habit. Once consumers discover the convenience of online shopping (and get online), spending will dramatically increase, and it is predicted that $US17 billion will be spent on online merchandise by 2001. This prediction will depend on the number of households with PCs continuing to increase.

Shopping on the Net can be convenient. Doors are open 24 hours, there is usually an easy and handy way to select exactly what you need and it is then delivered to your door.

And it doesn't end there. Forrester predicts that consumers will gain purchasing power — online 'regulars' that generate referrals will receive juicy incentives, individuals will form groups and then neighbourhood shopping clans to get discounts, and you'll get more 'presents' delivered to your door, said the report.

For Australians, another advantage of buying on the Net is discounts. You may have to wait longer to receive your products from US sites, but items such as CDs, books and software can be up to 50% cheaper. However, the costs of shipping the product, particularly if it is heavy and you want it fast, can make the purchase more expensive than buying it locally. If you are looking for an item that is not available in Australia, however, it may be worth your while.

Just a few words of warning — always remember to check the credentials and the security of the site and the online business that you are thinking of buying from. (The site may be an extension of a reputable physical shop, or it may have been recommended by someone else.) Also consider how quickly you want the product, as some mail deliveries can take months. If you are purchasing for a business, you should check the guarantees offered on delivery times and whether compensation is available if a much-needed product arrives late.

Security concerns

If you do find something you want to purchase, you will probably have to pay by credit card, and many customers are concerned about using their credit card on the Internet. However, if you are happy to give your card details over the phone or to a waiter at a restaurant, you should not be concerned about using it on the Internet.

Many online commerce sites use the inbuilt security features of your browser to ensure the transaction is secure. The most common security protocol used is Secure Sockets Layer (SSL) 3.0, developed by Netscape. The protocol uses private keys to encrypt the data being transferred over the connection. *APC* suggests you only buy from sites that allow secure transactions.

If you are still concerned, there are a few options open to you. You can email your credit-card details in a series of messages: even if one is intercepted, the 'spy' does not have all of your details. You also have the option of telephoning or faxing your credit-card details to the company. Also, once you are a registered

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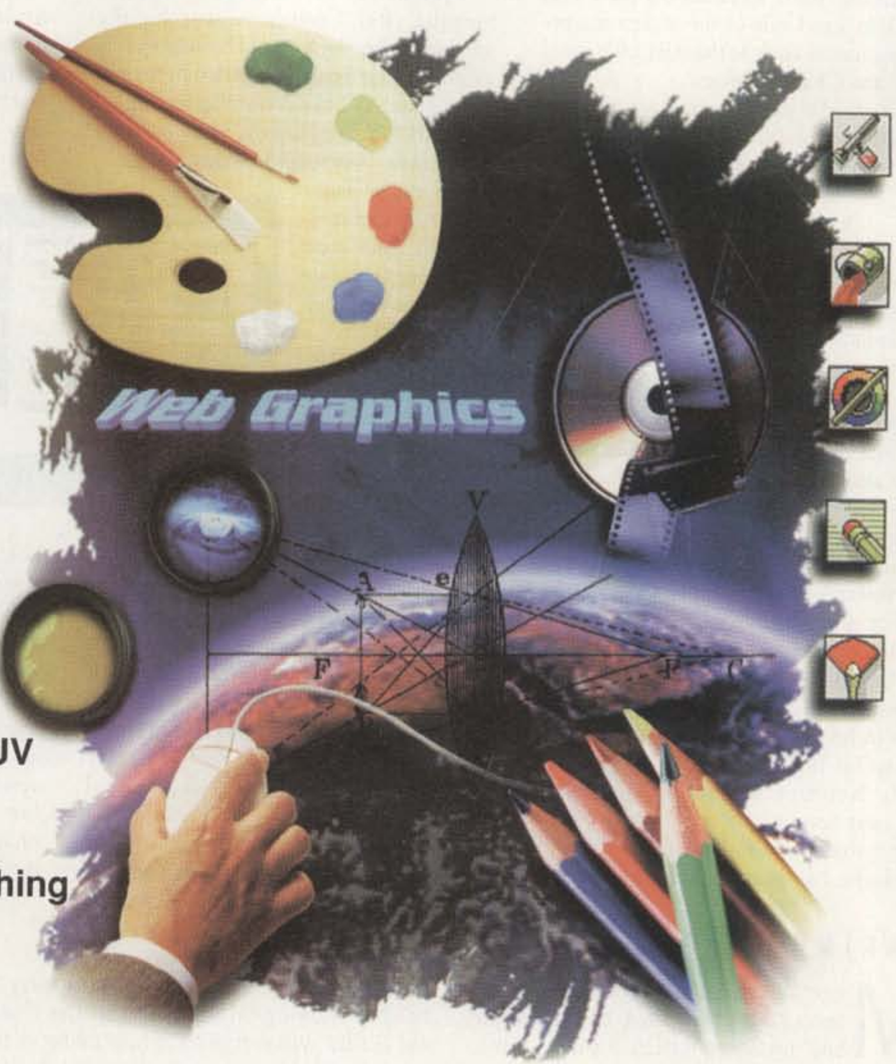

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NETCASTER VERSUS IE4: A MATTER OF INTEGRATION

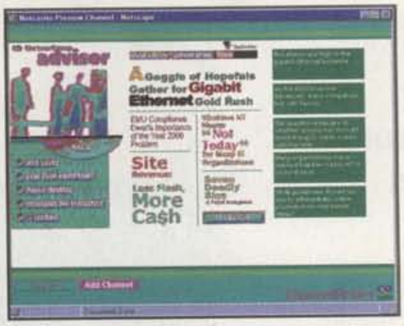
If you've opted for the full desktop integration installation of Internet Explorer 4.0, you can hardly have missed the Active Channel bar placed on the right-hand side of the screen featuring big names such as the ABC, Channel Nine and Channel Seven.

Or maybe you've gone for the full installation of Netscape Communicator. Run over the tab on the right of your screen with the pointer and out pops . . . a channel bar.

Making content deals with big media companies was important for both Microsoft and Netscape in the lead-up to the launch of IE4 and Communicator. However, it's around a year since both IE4 and Communicator with Netcaster became widely available in beta, and the channel component hasn't turned out to be a deciding factor in our choice of browser. It's even rumoured that Microsoft will leave Active Channels out of the browser altogether when it releases IE5 towards the end of this year.

For some time Netscape has been demonstrating its Aurora desktop, a workspace designed to be available and viewable on any computer platform as it runs in Java and lives on a server somewhere on the Internet. While it's not likely Netscape will release Aurora in the near future, the concepts involved aren't that far removed from the way Netscape has built Netcaster, and the concept of integration is becoming increasingly important in choosing a browser.

Netcaster was released several months after Communicator hit the market; a beta version of IE4 was widely available for many months before it went gold. As it turns out, both reached the market at roughly the same time.



Because Netcaster is written in Java, it acts more like a 'factory integrated' plug-in than part of a single large application, and its performance depends on Netscape's Java virtual machine (JVM) and, of course, your computer. Not that IE4's performance, especially in integration mode, is impressive, unless you're running at least a Pentium 90 with 32M of RAM; but remember that Netcaster is running one layer of 'abstraction' above the level of IE4, with the overheads that brings.

Adding channels and accessing channels using either browser is pretty straightforward. Netcaster's channel bar offers a preview of each channel. If you do subscribe, be sure that you've got the time to sit through the sign-on screens that most channels require you to fill out. Factor in the three windows that Netcaster insists on keeping open at all times, as well as the inbuilt lag of the Internet, and all up you're not really in for a dynamic experience.

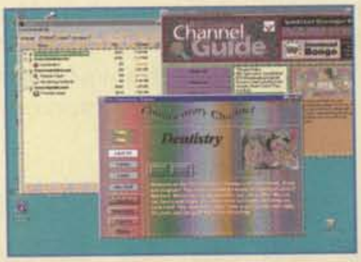
IE4 is faster than Netcaster, and not just because Microsoft's JVM is faster. It also gives you the slightly gimmicky option of having the channel content display on the Active Desktop and it's here that this integration factor comes into play. Overall, the process of accessing and subscribing to channels in IE4 is superior to that used by Netscape.

Either way, much of the content available from the channels is available more easily from the regular Web sites run by the same companies. The real issue is whether integration is important to you — because it sure is important to Microsoft.

Netscape is less well integrated with the operating system, and unless your system is reasonably fast, its Netcaster system is significantly slower than IE4, but it still has much to offer. In pure channel terms, however, Microsoft's Active Channels is a clear winner.◆

MARIMBA CASTANET

Marimba's push client, Castanet, has been built using Java, and it's not a bad implementation either — it's faster than Netscape's Netcaster, but then again it would want to be, considering members of the original Java development team founded the company. Also like Netcaster, Castanet has the annoying habit of opening multiple windows and leaving them open, which eats into available memory.



Marimba touts Castanet as a secure way for companies to deliver applications across the Internet, but like the other push vendors it also provides news, weather and sport reports. Marimba's partners don't seem to be on quite the same scale as those of Netscape, Microsoft and PointCast, however.

Subscribing to a channel is as easy as double-clicking on its listing in the Channel Guide. What makes it confusing is the 'Java lag' — the time that it takes for the computer to process your input and then tell the application the result. Get used to watching your hard drive go crazy as it churns through all that virtual memory you configured.

Although Castanet is a neat, well-constructed application, its slowness and lack of compelling channel content leaves you with no real reason to use it. That is, unless your business is looking at constructing an in-house push network; in this case Castanet, in conjunction with other Marimba tools, could be a very effective tool.

HOW WE TESTED

All testing was carried out using a Digital Celebris Pentium 90 with 32M of RAM. IE4's integration mode was switched off except when testing Microsoft's Active Channels. Applications run alongside the push technology included Lotus Notes 4.6, Paint Shop Pro and various Web editing tools.

Testing revealed that push channels tend to be slow (due to heavy use of Java) and bandwidth intensive, so keep in mind that our connection to the Internet was via a 256Kbps ISDN link. Regular dial-up modems will be significantly slower.

When push comes to shove

By Josh Gliddon

Two years ago, push technology such as PointCast was hyped as promising to change the way we used the Internet. Instead of going out to your favourite sites to see if they'd been updated, the sites would 'push' the information to you, so that when you logged on to your computer it would be ready and waiting. Or at least that was the idea.

Fast-forward to 1998, and while push may not have caused a revolution in browsing habits, it's a functional adjunct that will become increasingly important as the Internet makes inroads into non-PC devices such as Web TVs, smart mobile phones and pagers.

Ironically, the integration of push into browsers — with the push channels option in IE4, and the NetCaster component of Netscape's Communicator — was supposed to launch it into the mainstream. Other systems, like PointCast, Marimba and the short-lived IFusion, use dedicated client applications and often have very high bandwidth requirements. Some companies even blamed PointCast for network 'brownouts', due to the volume of data being pushed to each client.

The problem is that push suffers from exactly the same problem that plain old vanilla Web browsing does, and with reason: it is the Web, just in reverse. What this means is that push channels are still slow to use, because of slow modem speeds and the patchy performance of the Net. It still costs you a similar amount of money, or even more, to obtain material from the Web using push, even if your computer dials up in the middle of the night and downloads the data.

So what use is push, then, if it's just glorified Web browsing? That all depends on what you're after. Maybe you want to make your Web page more accessible to people? Using Microsoft's Channel Definition Format protocol you can create your own basic channel very easily; if your company has an intranet, a push channel might be a great way to distribute material to your employees. Or maybe you just think it's nifty to log on in the morning and find your PC has already downloaded your customised news, sport and weather. In any case, push is here to stay, so log on, configure, sit back and wait!

PUSH IT

You can install PointCast Network News Service and Castanet Tuner from the **Internet SuperGuide CD**. Just click on **Push Technology** and follow the instructions.

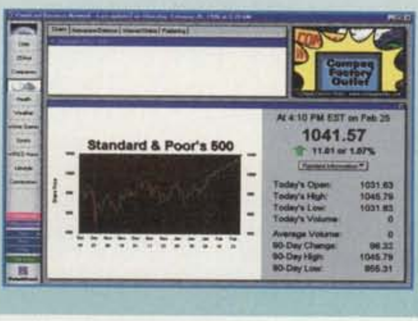
POINTCAST NETWORK

Nearly four years old, PointCast is the veteran of the push technology scene. It's also the only vendor left standing out of a bunch of companies that released push services back in 1992.

PointCast survived the integration of push into Internet Explorer and Communicator by concentrating on delivering quality information, as well as by allowing PointCast services to be delivered through IE's push channel, in addition to PointCast's proprietary client.

As well as news, weather and sport, PointCast also offers region-specific and industry-specific editions, although the region-specific editions still seem to have a high proportion of US content, and the Asian region edition is passable at best.

Accessing the extended PointCast services still requires the use of the PointCast client, which needs to be downloaded from the company's site. Like those of IE and Netcaster, PointCast's subscription process is pretty straightforward; but the client, which needs to be constantly active to take full advantage of the push technology, can hog a significant amount of processing power on older computers.



At 4:10 PM EST on Feb 25
1041.57
11.61 or 1.07%

Today's Open: 1031.63
Today's High: 1045.79
Today's Low: 1031.63
Today's Volume: 0
Average Volume: 0
90-Day Change: 96.32
90-Day High: 1045.79
90-Day Low: 955.31

The PointCast client's other two unique features are the ticker that runs along the bottom of the screen, and the screensaver that pops up by default after around three minutes. This interval is easily changed, but it's a reasonably annoying feature, and one that you're unlikely to really use unless you're keen on sitting passively in front of the monitor.

Overall, unless you've got a specific reason for needing the PointCast client — such as working in an industry covered by one of the industry-specific channels — then PointCast is nothing more than an overhead on your machine, and one which could be avoided by using IE's or Netscape's channel clients.

files), these are highly bandwidth intensive and, again, need to be fully downloaded before they can be played, leading in many cases to long delays.

Streaming systems download audio and/or video continuously as they play it. This results in faster response times and a continuous experience, but at low bandwidth the quality can range from appalling to absolutely unlistenable and unwatchable. Version 5.0 is a considerable improvement over previous offerings in this respect. At periods of high demand, though, it's still possible you won't see or hear anything at all.

Despite these glitches, RealAudio and RealVideo have been widely adopted, especially by news sites and companies involved in selling music (as it allows music to be offered to fans without them receiving a permanent, free copy). HotBot lists more than 40,000 pages featuring content for the RealPlayer software. The number would probably be higher if it were not for the requirement that special server software be installed to distribute RealAudio and RealVideo files, which has somewhat restricted their uptake in the non-commercial Web community.

The main rival for RealPlayer in the video stakes is a product that actually predates the Web itself: Apple's QuickTime video format. Although QuickTime wasn't designed especially for Web use, it remains a popular means of offering video footage online (HotBot lists over 120,000 sites featuring QuickTime files), and Apple offers a plug-in to make such videos directly available within the browser. Its principal disadvantage is speed: QuickTime files are nearly always large, and can't be streamed with the basic plug-in.

Another file format which predates the Web but has become popular within it is Adobe's Acrobat portable document format (PDF), designed to make documents available across a wide range of systems without compromising their appearance. Since HTML actually offers similar functionality, Acrobat has not been the stunning success Adobe might have hoped, but it has enjoyed a certain degree of success online, especially on corporate and government sites.

More, more, more

In addition to these highly popular plug-ins, there are plenty of others available. Some have similar features to those described above, including, for instance, numerous alternatives for streaming multimedia. Others allow the reading of highly specific file formats, such as AutoCAD files. There are also many 'application-like' plug-ins on the market, ranging from spell checkers to world time clocks. It's questionable whether these are any more useful as plug-ins than as standalone applications.

Because of their ubiquity, it's probably worth making sure the four plug-ins mentioned above are installed as part of your basic browser setup. Other plug-ins can then be installed as you need them. In most cases, if you access a page which requires a plug-in that you don't have, your browser will inform you of the fact and offer to take you to a location where you can download the plug-in. It's then up to you to decide if the content you're seeking is worth the time and effort. To speed up the installation of plug-ins, grab them from a CD rather than online (see above 'Where to get plugged in' for details).◆

WHERE TO GET PLUGGED IN

You can find all the plug-ins discussed in this article (and many more) on **The Internet SuperGuide CD**. Just click on the **Plug-Ins & Add-Ons** link on the main page.

Plug-ins are also updated frequently (at least as often as browsers themselves). The easiest way to keep up with the latest plug-ins without incurring a hefty download charge is to pick up a copy of *APC* from your newsagency each month; the cover CD includes an extensive selection of the latest plug-ins.

HOW TO GET PLUGGED IN

While every plug-in you install will have a slightly different installation procedure (often detailed in a README.HTM or README.TXT file), the main steps are usually as follows.

1. Download the installation file (from an online location or CD), and save it to a temporary directory on your hard drive. If the site you are using has installation instructions, you may want to print these out before continuing.

2. Exit your browser (some plug-ins will install with the browser still open, but the majority won't).

3. If the installation file has been compressed (with ZIP or HQX file), you'll need to unzip it before installation. There is a selection of unzipping utilities on the Internet Superguide CD.

4. Run the installation file, which will guide you through the process. To avoid problems, close down other Windows applications before you do this.

5. Many plug-ins will require you to reboot your machine after installation. (This can be a nuisance if you're connected to the Net at the time, so you may want to download the plug-in and then install it when you're using the machine offline.

The next time you run your browser and try to access content that requires the plug-in, it should be invoked automatically. If you have problems, check the plug-in's README file and any other documentation, and then check its developer's Web site to see if there are any additional installation tips.

Many plug-ins and ActiveX controls used by Internet Explorer, and some used by Netscape Communicator/Navigator, will automatically begin installing themselves once they have downloaded. This can be very convenient, although if you choose not to install required plug-ins, some sites will nag you to do so in a highly annoying fashion.

PLUG-INS CAN GREATLY ENHANCE YOUR WEB EXPERIENCE
— BUT WHICH ONES DO YOU REALLY NEED?

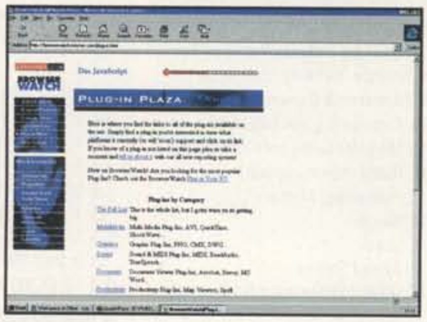
Getting really plugged in

By Angus Kidman

The beauty of the Web is that the information it provides isn't tied to a particular type of computer or operating system. Although a Web page may look slightly different in Netscape Navigator and Internet Explorer, and slightly different again if the page is accessed on a Mac rather than a PC, the similarities will be much greater than the differences.

While this works effectively for text and reasonably well for static images, it has proved much harder for Web browsers to deal with more complex types of files, such as audio, video or application-specific files. These usually require highly platform-specific programming to work effectively. Whereas most operating systems handle text in a similar way, video is another story.

A browser that deals with all these file types effectively would be very large and unwieldy, and it would also make developing a browser to work on multiple software platforms much harder. The solution is plug-ins: add-on applications that deal with just one type of data, making it available to just those users who want it.



Plug-ins are normally written for a specific platform, and often for a specific version of a browser (though newer versions often include multiple variants in a single installation package). Some plug-ins used with Microsoft's Internet Explorer are referred to as 'ActiveX controls'. These are slightly different in architectural terms, but their function is usually identical to that of plug-ins.

Set me free

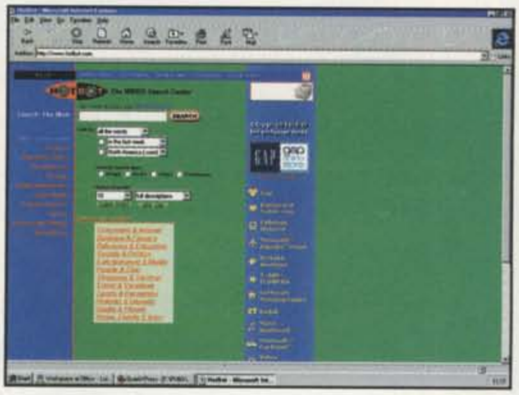
Although there are exceptions, plug-ins are usually free for the end user. Plug-in developers make their money from sites that use data created for the plug-in, either by requiring a special server to make that information available (the approach taken by RealNetworks' RealPlayer), or by requiring site developers to buy special packages to create the content for a plug-in (as in Macromedia's Shockwave, which uses files created by one of Macromedia's multimedia development applications).

Even when developers do charge for a plug-in, it will often be an enhanced version, and a more basic version will be available for free. RealPlayer, for example, is available in an enhanced 'Plus' edition (for $US29.95), which includes features not found in the standard version, such as the ability to save downloaded files and add customised buttons to the plug-in for frequently visited sites.

What you need

There are a lot of plug-ins around; BrowserWatch's Plug-In Plaza (http://browserwatch.internet.com/plug-in.html) listed more than 200 at the end of 1997. In practice, though, there are only a handful that virtually everyone will use at one time or another.

One of the most commonly used plug-ins is Macromedia's Shockwave, which provides access to a wide range of multimedia content, ranging from simple animations to fully interactive games. Shockwave is so prevalent, in fact, that search engine HotBot (http://www.hotbot.com) allows you to search specifically for Shockwave content as part of its basic search, and lists over 50,000 pages featuring such content.



The most recent version of Shockwave actually allows the playback of content generated by three different applications: Flash, Director and (with an extra add-in) Authorware, but these distinctions aren't important to the end user. Shockwave is particularly popular on home pages for major motion picture releases. The main drawback of Shockwave is that content created with it can grow to be quite large, and can't always be 'streamed' effectively; if you're playing a Shockwave game, it often won't work until every last byte has been downloaded. The results, though, are often worth the wait.

While Shockwave shines in the general multimedia field, RealNetworks' RealPlayer has taken a leading role in one of the most hotly contested areas: streaming audio and video. While basic browsers include the ability to play back standard audio files (such as WAV or AU

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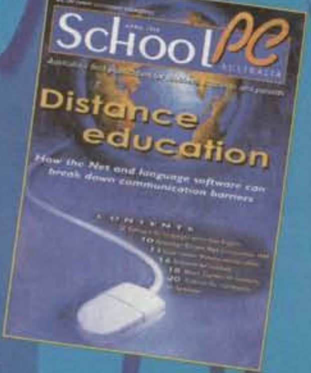
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1. Which of the following job titles most closely matches your position?

☐ 1. Managing Director, General Manager
☐ 2. Data Comms/Network Manager
☐ 3. LAN Manager
☐ 4. Microcomputer Manager
☐ 5. MIS Manager
☐ 6. EDP/DP Manager
☐ 7. Project Manager/Group Leader
☐ 8. Engineer/Architect
☐ 9. Accountant/Finance Officer
☐ 10. Systems/Programme Analyst
☐ 11. Consultant/Advisor
☐ 12. Other Computer Department Employee
☐ 13. Educator
☐ 14. Sales Representative
☐ 15. Office Administrator
☐ 16. Student
☐ 17. Other Professional
☐ 18. Other (please specify)

____

2. What is your organisation's primary business activity?

☐ 1. Government, Utilities
☐ 2. Agriculture, Mining, Oil
☐ 3. Transportation
☐ 4. Construction
☐ 5. Computer Manufacturer/Distributor
☐ 6. Communications
☐ 7. Computer Retailer/Reseller/ Consultant
☐ 8. Finance, Banking, Insurance
☐ 9. Research & Development
☐ 10. Engineering, Architecture
☐ 11. Manufacturing (non-computer)
☐ 12. Retail (non-computer)
☐ 13. Publishing, Media
☐ 14. Health
☐ 15. Legal
☐ 16. Armed Forces
☐ 17. Other (please specify)

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☐ 2. $1 - $999
☐ 3. $1000 - $4999
☐ 4. $5000 - $9999
☐ 5. $10,000 - $49,999
☐ 6. $50,000 - $99,999
☐ 7. $100,000 - $249,999
☐ 8. $250,000 - $499,999
☐ 9. $500,000 - $999,999
☐ 10. $1,000,000+

4. How many microcomputers are you directly responsible for at work?

☐ 1. 1 - 9
☐ 2. 10 - 19
☐ 3. 20 - 49
☐ 4. 50 - 99
☐ 5. 100 - 499
☐ 6. 500 - 999
☐ 7. 1000 - 1999
☐ 8. 2000 - 4999
☐ 9. 5000+

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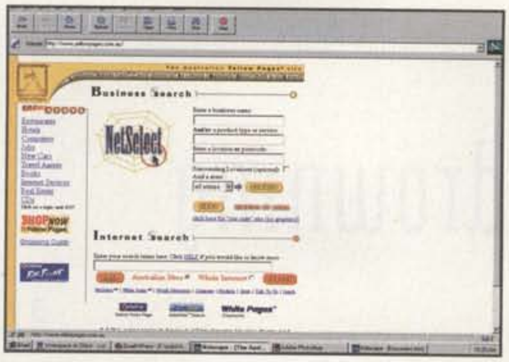
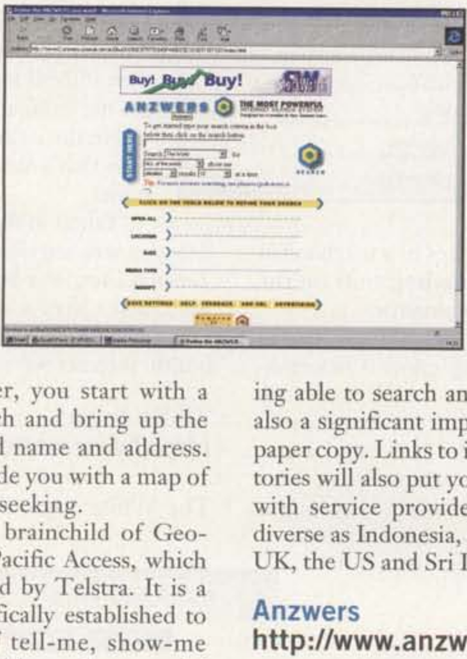
expect from a phone book, and, unlike the dead tree version, you don't have to be a body builder to handle it. You can dredge up any name that is to be found in any of the state phone books around the country at the click of a button, and it's also a useful resource if you're looking for a government department but are unsure of what it's called. You're allowed a little poetic licence: as long as you use at least one of the keywords in the title, it will interpret what it thinks you're looking for and return a list of likely options.



Less impressive however, compared to the US Yahoo 'draw me a map' option, is the Whereis add-on to the White Pages. While the US Yahoo's street search managed to correctly interpret my wrongly spelled street name and bring up a correct map, the Whereis function in White Pages could not come up with the goods. When I typed in my own street name spelled incorrectly, it produced a map of the suburb at large, featuring the local park, but not my street. The fact that I knew in which direction to head from the park meant that I could navigate from that map to a map showing my own street; but let's face it, using the Net is all about searching out what you don't know, not what you do know. If, however, you start with a White Pages search and bring up the correctly identified name and address. Whereis will provide you with a map of the address you're seeking.



Whereis is the brainchild of GeoProducts, part of Pacific Access, which is, of course, owned by Telstra. It is a business unit specifically established to match the sort of tell-me, show-me expectations created by such successful implementations as those on the US Yahoo site. It's a good start, and the site's developers promise improvements.

Yellow Pages
http://www.yellowpages.com.au

The Yellow Pages site takes the leap from finding products and services to allowing you to buy them. You can choose to search for all the companies in a particular product category, or you can go straight to the directories of companies that are set up to sell it to you over the Net. The Yellow Pages Shopping Guide will direct you to a range of local and overseas vendors that have the products you want — from computers (http://www.yellowpages.com.au/yp/sguide/yp_sgc_pchaware.html) to wine (http://yellowpages.com.au/yp/sguide/yp_sgc_wine. html). Sending flowers to Denmark? No problem, you can view a selection of local flowers, and send a dried arrangement of Australian native flowers, all at the click of a button, if you're happy to impart your credit-card details.

As with the White Pages, the advantage of being able to search any state directory is also a significant improvement over the paper copy. Links to international directories will also put you directly in touch with service providers in countries as diverse as Indonesia, Canada, Spain, the UK, the US and Sri Lanka.

Anzwers
http://www.anzwers.com.au

Anzwers, as its name implies, is built for those of us in Australia and New Zealand's corner of the world who don't necessarily want US answers to our Net searches. How many times have you looked for information about policy or government departments, only to find about a million entries from Pittsburgh to Pennsylvania but nothing even as close as Perth. Answers is the answer. Well, one of them, anyway. Answers also helps out with useful tips, such as telling you to use the 'Modify' option to exclude sections before you start searching, rather than waiting until you get a mass of stuff you don't need or can't use.

Once you are familiar with the Net, such things seem self-evident, but Anzwers offers a friendly interface, and is reasonably likely to return a useful list from your first search, which can turn an otherwise frustrating experience into a positive one.

Anzwers offers a list of criteria, such as date and media type, which you can open and use, or close and ignore, in order to refine your search. This is useful for newbies, as well as for business users who have little time for searching and researching.

Of course, you're not restricted to searches of Australian and New Zealand sites and references, so if it's cigar-smoking Texan factory-working women you're after, Anzwers can help you there as well.

Anzwers licenses its searching and caching technology from Inktomi, and recently laid claim to being Australian Net users' first choice in search engines.◆

SEARCHING
FOR MORE

The **Internet SuperGuide CD** includes more information on search engines and directories.

Clicking on the **Search Tools** link will show you a list of utilities to help you search and research, as well as links to extra articles on the topic of searching.

'Boolean logic' explains how database searches work, and how to use Boolean operators. **'You've got a friend'** looks at buddy clients, and how they can help you get in touch with a long-lost friend, or find others who share a special interest.

The CD also includes an **Internet Glossary**, with explanations of dozensof the most important Net-related terms.

IF YOU'RE FEELING LOST IN A SEA OF INFORMATION, SEARCH ENGINES AND DIRECTORIES WILL HELP YOU STAY AFLOAT.

Not waving, drowning

By Helen Dancer

If it were not for a handful of search engines and the directories that sit on top of them, I would never even venture into cyberspace. I'm serious. The concept of sitting in front of a computer aimlessly meandering through the Net world bores me silly. Doing the same when you're actually looking for something specific is enough to drive your blood pressure to boiling point.

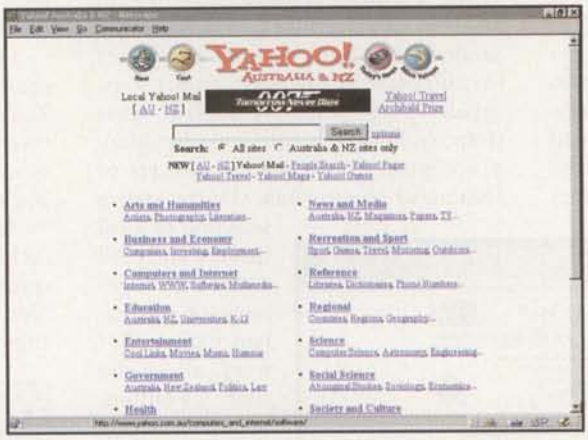
The pressures of the business environment are just not conducive to the amount of time it would take to sift through all the information that's supposedly germane to your enquiry, and even with your average search engine, there's a catch: because of the amorphous nature of the Web, typing the same search keywords twice in a row, even minutes apart, is likely to turn up a completely different list. Believe me, I've tried it!

While a search usually targets the keyword, it might also seek the individual letters that make up that word. This goes a long way to explaining the fact that a recent query I tried on President Mahathir Mohamad of Malaysia returned a site featuring cigar-smoking Texan factory-working women!

So while others surf effortlessly and discover oblique jewels of dubious, passing or intense interest, I tread water, not too proud to admit the need for a little guidance.

I'm not the only one. Internet research consultancy www.consult reports that the most popular search engines among Australian Net users include http://www.anzwers.com.au and http://www.yahoo.com.au. Telstra's SpringBoard directory is also a good place for Australian content (http://springboard.telstra.com.au), according to spokesperson Maya Sydney.

Yahoo is, of course, not a search engine in the strict sense — it's a directory. But the lines are blurred for the task-focused user, and since Yahoo has achieved such currency as a mechanism for going out and finding stuff on the Web, let's not talk semantics.



Directories are much more useful for quickly locating general information, and when your search is already pretty well defined. Uses for a search engine query include the hopeful tentative search at the extremities of your special subject, and while they might trawl some gems, there's also potential to dredge up a lot of dross.

Yahoo
http://www.yahoo.com.au

Yahoo uses the AltaVista search engine, which in my personal opinion is the most likely to return a vaguely useful list. The Yahoo directory structure on top of AltaVista is a pretty comforting combination.

I'm a big Yahoo fan — anyone who chooses to eschew the title CEO on a business card, in favour of the words 'Chief Yahoo', as Jerry Yang does, earns no small measure of respect. But while the Australian Yahoo site is, to use the vernacular, *cool*, it still has a way to go to match its US counterpart in sheer diversity and all-encompassing usefulness. The US site guided me through the process of locating the office of our US contributor (based only on his name and a wrong street address), through the use of the online phone book. Yahoo correctly interpreted my mistake in the street name, and then offered to draw me a map to get me from anywhere reasonably within the vicinity, to his doorstep. Now that's American service with a smile!

Yahoo in Australia will sort the sites you seek into just Australian or New Zealand sites, or a broader search if you wish, and offers a very comprehensive range of subjects, from the humanities to health, Internet services and the sciences.

White Pages
http://www.whitepages.com.au

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they can get instant gratification. Simple, bold graphics and an absolute minimum of scrolling on the first page are essential. And don't forget that there are people all over the world that will be looking at your pages. Use familiar icon-based graphics, other languages if necessary, and always include your postal, phone and fax contacts on the first page. Many people see the Net as a sophisticated Yellow Pages, but they may not be able to email directly back due to national, political or other restrictions. Leaving out your contact details is a sure-fire way of creating a dissatisfied customer. Once you are happy your home page has satisfied the criteria of speed, engaging the casual browser, ease of understanding and contact details, it is time to move on to more subtle aspects.

Information

By far the best way to get your site onto a broad range of bookmark lists (where they are marked so users can go straight back to them without searching) is to make it informative. Sites which simply advertise that the company and the products it sells are brilliant, are frankly a waste of hard drive capacity. Sites which provide useful and relevant free services — such as local wind speed and direction information at a yachting outlet, currency exchange rates on a travel agency site, or free samples of games at a software site — will all guarantee a higher return rate. Other information-related aspects include either a good search engine, or a comprehensive series of hotlinks to other sites with a common theme. This will ensure your site is more likely to become the first point of contact for regular visitors. Telstra's Big Pond site is a good example.

Any other information you supply should also be useful. Where to buy, how much and, if possible, direct purchasing information should all be spelled out onscreen. If your products have had any reviews or comments made about them, insert links to the sites where these can be found. The average Web surfer is well aware of myriad such reviews-based sites, so if you pretend they don't exist you can lose credibility, especially if some reviews are less than favourable.

Although many sites are now offering video and audio as teasers about products, remember this can disenfranchise the large number of Web surfers who are less multimedia equipped, and it will also slow down access for those outside the US or your local ISP's range. Keep things simple unless the product (such as music downloads) demands more.

Transactions

Using your Web site as a direct sales tool is very tempting, but be sure it works in your best interests. Some companies, such as the Harris Technology Superstore, link their stock database to the Web page, so users can see exactly what is in stock. This is essential, because any customer who orders direct on the Net does so for one reason — speed. If they have to wait because your stocks are low, they will feel more outraged and disappointed than if they had attempted a normal postal or telephone transaction. This is the real make or break of Net commerce — instant access should mean instant delivery, and you should ensure your stock reporting systems have been designed or modified with quality of service in mind.

Most major financial organisations will be able to help you set up some kind of electronic commerce system based on credit cards, and the degree of security now employed in browsers will help users feel more comfortable working this way. In real terms, Internet buying is no less secure than any telephone transaction, but offering a call-back service for those that don't want to reveal their PIN number on the Web could tip the balance in favour of a sale. (See 'Shop 'til you drop', page 141)

Many companies don't bother with complex Web sites based on a home page and standard page-through hierarchy; instead they buy hotlinked advertising space on a very high-traffic page, such as those hosted by Telstra, AltaVista or Yahoo. This approach will definitely generate a very high response rate; but again, if you don't have the carrot behind the button, surfers will quickly go elsewhere. Using the competition or free-draw hook seems to work well, but it can be expensive, especially if you end up having to freight prizes to the Sudan or Siberia. Make sure you can justify the costs before you decide to go this route.

Maintenance

There is nothing more frustrating for someone who has just received a big ISP bill than logging on to a site promising a bevy of attractions which turns out to offer only out-of-date information or 'under construction' banners. Keeping the site current is quite likely to be a daily exercise, and any site manager should be aware of the large amount of work this entails.

Many companies have an automated approach to this, linking their site to everyday business applications such as personnel emails, special offers and company news. Be aware, however, that this kind of close link can be a problem if any unwanted guest (hacker) decides they want to investigate your system via the Internet. A very solid barrier between the company and outside (a firewall) is advisable before you start implementing this kind of direct connection to company information.

But if you take a sober and judicious approach, based on knowledge of Net habits rather than print or TV advertising techniques, the Internet could give your business a definite advantage. Have a look at some successful sites, such as Intel, Amazon or Iomega, and you will see the difference. If you have a computer, making your own Web presence felt is worth a try. ◆

START BUILDING

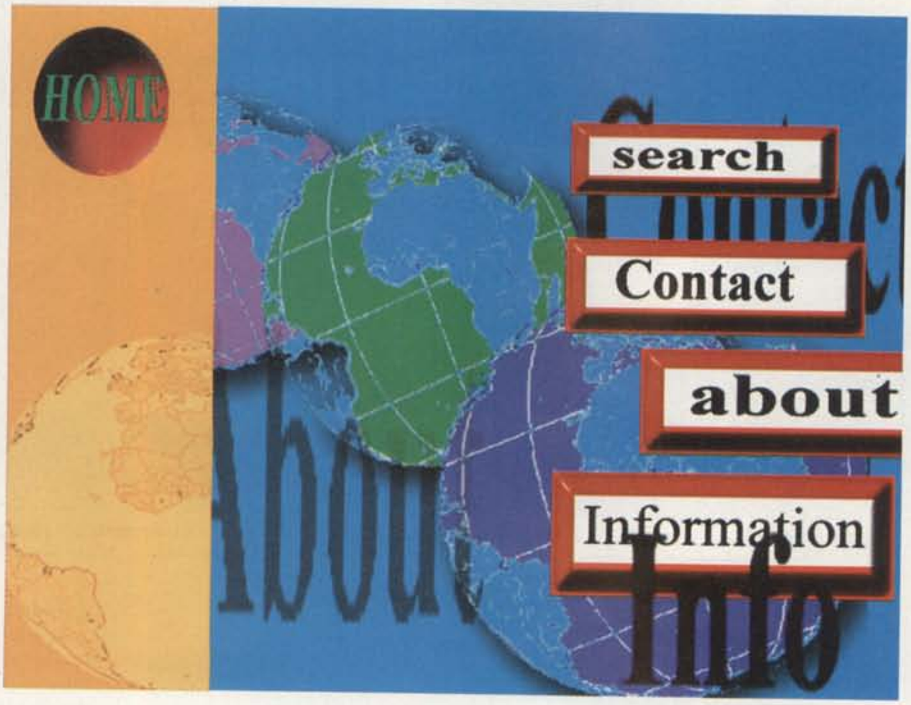
The **Internet SuperGuide CD** includes all the latest and greatest Web page design and maintenance utilities and HTML tools.

Just click on **HTML Tools** for a complete listing.

THE INTERNET IS PROCLAIMED TO BE THE MEDIUM OF THE DAY,
BUT HOW CAN YOU MAKE YOUR WEB PRESENCE FELT?

Take a walk on the Web side

By Jeremy Torr



The number of users signing up on the Net is staggering. The current rate of expansion is estimated at around 150% per year. Right now there are well over 1.5 million users in Australia. So even taking into account a little massaging by the talkers-up, this is a big and expanding market opportunity.

However, trying to gauge a market or response by simply looking at numbers is a technique developed for such media as TV, newspapers and radio. In these media, listener or viewer numbers are paramount; but this kind of measurement simply doesn't work for the Internet. Sure, there are millions upon millions of people out there in the connected world, all of whom are potential visitors to your site. But they may never visit — and even if they did, they may click straight through to another site.

This is because the Internet is not made up of the usual demarcated groups, such as suppliers and consumers, readers and publishers, viewers and broadcasters. Instead it consists of a huge amorphous mass of connectees who may or may not be interested in anything and everything as they wander almost at random around the World Wide Web. The act of 'surfing the Web' is more a pastime in its own right than an adjunct to consuming information or products. The Internet is a bit like a huge shopping centre, but the majority of people drive round it or walk through instead of actually going shopping, and always do much more window-shopping than buying.

The Internet takes the idea of the five-second 'brain candy' concept to new heights. The user has no need, no constraints and no reason to stay anywhere longer than it takes to assimilate the one screen they are currently looking at. Consequently, the core of Web page design should centre purely around that initial impression, that first design 'hit', which must also be crafted to relate to the kind of person you want to keep looking at your site. It should grab the Web surfer, and encourage them to linger.

Cost and speed

One of the discouraging things about any Web site design is that it will most likely not be worthwhile initially. One of Australia's first major sites cost Village Roadshow tens of thousands of dollars to create and maintain, yet the company had no idea how or where it would recoup the money. It acted purely on a hunch that the Net was the right place to be. Similarly, any company or individual looking for an instant and quick payback of the time and effort spent creating a Web site will be disappointed.

Many industry pundits currently estimate that only two sectors are doing very good business out of the Web: search engine companies and server/router manufacturers. Most other organisations with a Web presence are either providing a service, or waiting for the good times to arrive. But approaching Web site creation with a cut-price mentality will not produce good results, so you need to be prepared for a loss.

Probably the second most important aspect of any Web site is speed. Forget the beautiful graphics and full-colour images. If it takes longer than a few seconds to fill the page, users with their $5-per-hour plans will soon go somewhere

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3 ☐ Transport
4 ☐ Construction
5 ☐ Computer Manufacturer/ Distributor
6 ☐ Communications
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7 ☐ $250,000 - $499,999
8 ☐ $500,000 - $999,999
9 ☐ $1,000,000+

4. How many computers are you directly responsible for at work?

1 ☐ 1 - 9
2 ☐ 10 - 19
3 ☐ 20 - 49
4 ☐ 50 - 90
5 ☐ 100 - 499
6 ☐ 500 - 999
7 ☐ 1000 - 1999
8 ☐ 2000 - 4999
9 ☐ 5000+

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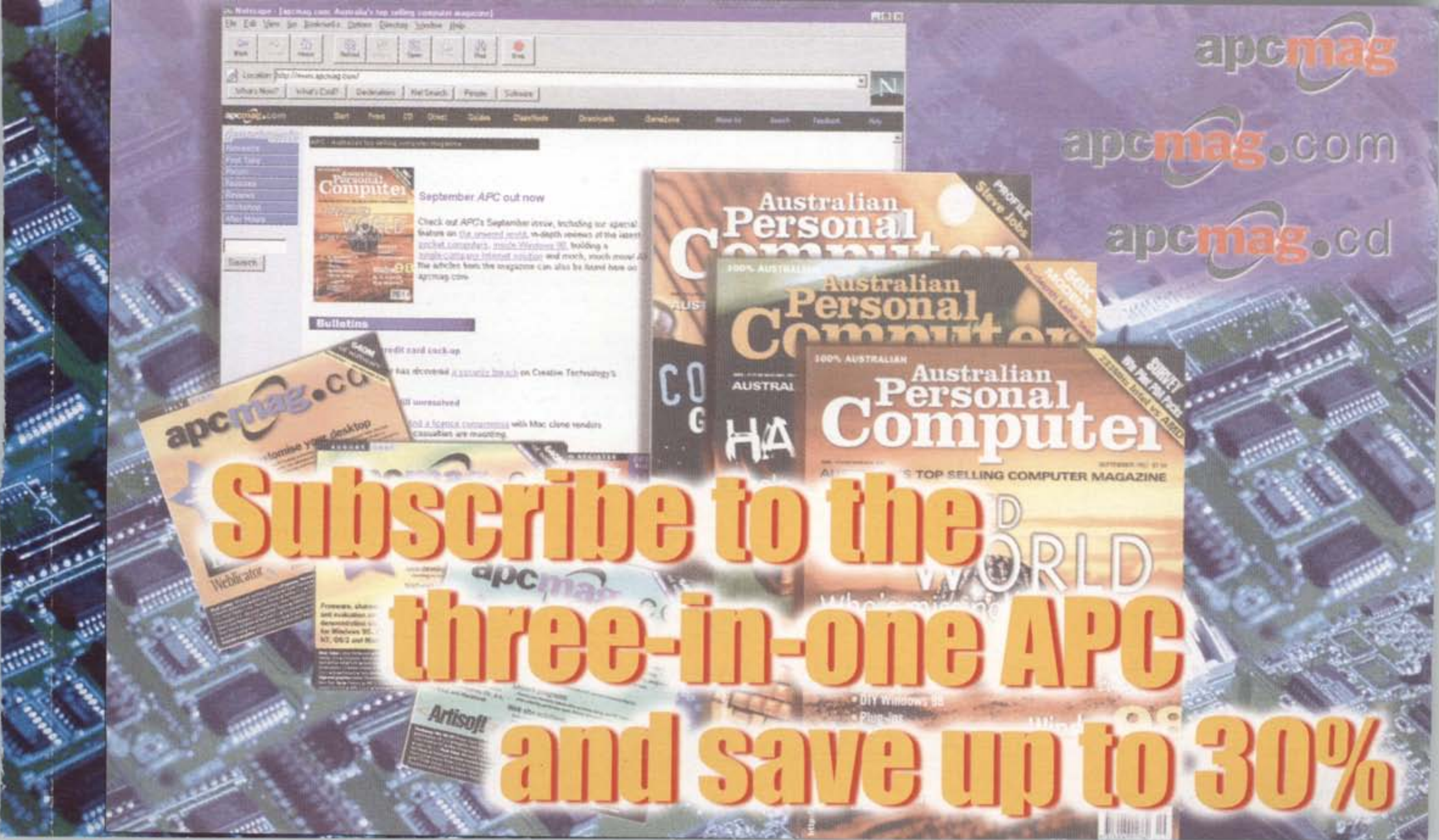

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9 ☐ Accountant/ Finance Officer
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11 ☐ Consultant/ Adviser
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13 ☐ Educator
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- To provide easy, fast access to all the files and resources we talk about in APC to save you download time and money.
- To make it easy for our readers to get on the Internet so they can use our interactive Web site.
- When you read about a program in the magazine, such as a piece of software from our Shareware column, you need only insert apcmag.cd, browse it with your favourite WWW browser, and download the file directly from the CD.

like calling a wheel a car. One is an essential part of the assembly, but by no means the whole thing.

What else?

Other popular areas of data exchange which help make up the Net as a whole are email, FTP (file transfer protocol), Usenet, IRC (Internet Relay Chat), telnet, and Gopher. Each of these has its own particular role which can help any user get the most out of their connection. One of the most commonly used tools for Net users is email. Contrary to popular belief, you don't need to connect to the Web to access your email. Every Internet connection comes with its own email address.

Although most Web browsers include an email option, there are plenty of shareware and specialist commercial email applications (such as Eudora and Rebecca) which offer faster and more customisable access to email without having to log on via your regular Web browser. The speed, low system demands and accuracy of the dedicated email application tends to make them a favourite among the business clientele, as Web browsers are not known for their lightweight and pencil-thin operating requirements. The other obvious advantage of having a dedicated email system remote from the Web is that the user can work happily uncluttered by advertisements, slow-loading graphics detritus and distracting exhortations to 'Click Me and Win'.

> Calling the Web the Net is a bit like calling a wheel a car.

Probably the second most useful Net utility is FTP. This is a simple and effective way to exchange data with another computer, based on sending files in a series of packets. This means that, as long as you know the address of the FTP site (these are usually found at philanthropic sites such as universities), you can browse through its list of downloadable files to your heart's content — a bit like wandering down the library aisles. When you catch a glimpse of a file which you like the look of, you can request a copy from the site and it will immediately send it to you, even if the server is in Finland. The big advantage is that it doesn't undergo any coding or encoding, so you get what the file server sends — unlike some attachments to email or encoded messages from Web sites. Using FTP in this way is generally quicker and less distracting than doing it through a Web browser, although in this case speed is not really an issue, as the file transfer depends more on your connection and the demand on the FTP site.

Want to chat?

The other big attraction of the Internet for long-time users is IRC. This allows users with text-based terminals to hold a typed conversation onscreen. It's almost in real time, too (the delay is not enough to make you lose your train of thought). IRC allows anybody to log onto a chat channel and enter their chosen conversation, and to either contribute when they like, or simply sit in and 'listen' to the conversations happening onscreen. If there is a topic which interests a few of the chatters, they can create their own spin-off chat session, which can then generate its own public or private sessions.

The disadvantage of IRC is that it can attract the Net equivalent of the hoon. There is little that can be done about these types, besides going offline and coming back when they have gone, or moving to a private session. Keep in mind that your IRC comments are available to anyone subscribing to the channel, so privacy may also be a concern. And for business purposes, IRC doesn't have the speed and versatility of some videoconferencing solutions, but it is still a cheap and effective way of communicating with many people, across great distances.

Another way to keep up-to-date with a large cross-section of other businesses or users is to subscribe to a newsgroup. This is a sort of gigantic electronic noticeboard, which can hold as many messages as you want about a particular subject. When users log on, they can see a sort of running conversation between electronic 'notes' posted on the board. It is not interactive in the way IRC is, but allows users to post and seek information on a designated subject. There are thousands of newsgroups on the Internet, dealing with everything from Star Trek to gardening and genealogy. Although newsgroups are related to a subscriber list on someone's email listing, they are less intrusive, as the user only gets the information they require when they want it, not every time they download their email. Special newsreader programs will allow users to follow a series of related postings without being distracted by unrelated postings which would otherwise hinder the flow of information.

Push technology (see 'When push comes to shove', page 138) is more automated than newsgroups, but it's likely to bring the bane of the Web surfer — advertising — to your desktop. Push subscriptions offer a sort of newsgroup crossed with a newswire update service, but delivered right into your desktop. This system is only supported by the newer Web browsers, and you need to fire up your browser on a regular basis to make the most of the material being 'pushed'. Otherwise you may as well stick with using newsgroups and filters.

As with any technology, it's what you use it for that gives you the advantage. Just browsing the Web isn't usually very productive, but using the Net can be, as long as you use all of it.◆

BUSINESS APPLICATIONS

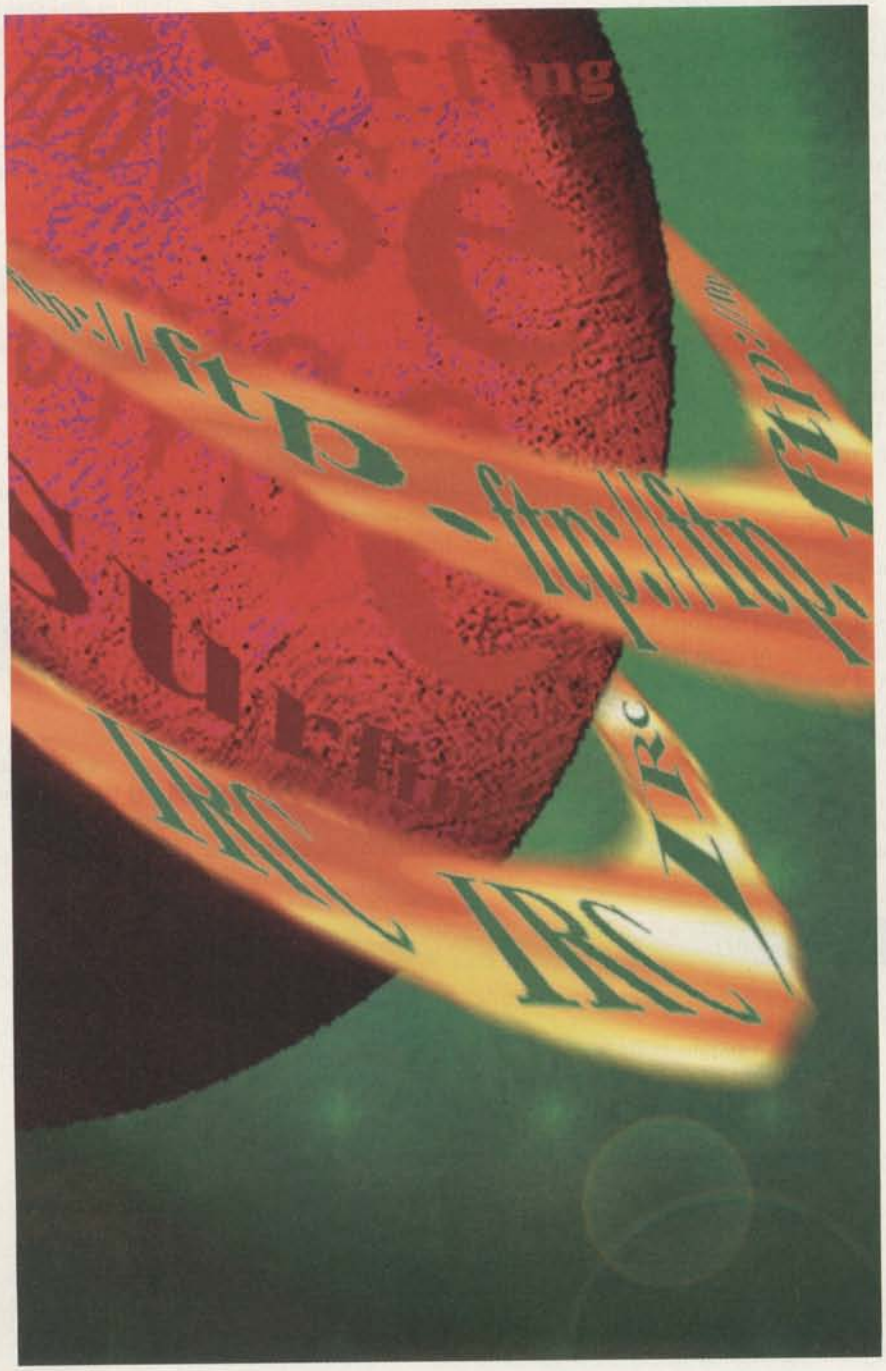
Maintaining a Web site is a time-consuming and tricky business, but maintaining a simple FTP server or setting up your own newsgroup demands a lot less time and expense, and once it's running, it can be almost self-supporting. All you really need to do is a little bit of housekeeping and file updating, in the case of FTP sites, or some supervising, in the case of a newsgroup.

Once you have established the flow of information on a subject, you will find that the email contact list will update itself, useful suggestions will pour in (as well as useless and downright rude ones, admittedly) and the group will maintain its own momentum — as long as it gets a prod in the right direction now and then. Offering established newsgroup or IRC regulars a special promotional deal is a much better approach than spamming (see 'Managing your email', page 125). Tupperware uses this strategy on its IRC chat sessions each week.

THERE'S MORE TO THE NET THAN THE TRANSMISSION OF IMAGES AND TEXT.

The Net is not the Web

By Jeremy Torr



Talk to any nerd in your local Internet cafe and they will bore you with endless stories of Web surfing — how they know all the good sites backwards, how many megabytes their ISP can upload in a minute, and the best rates you can get for connecting to the global network. But ask them about FTP, about IRC, about newsgroups or push technology, and you will probably be met by a blank look and an obvious lack of comprehension.

The Net is much, much more than just a global communication tool. Probably the most widely used and accepted aspect of the Net today is the Web. This is a simple set of connections which use a clever programming technique to allow images and text to be transmitted almost anywhere on demand. The real attraction of the Web is its point-and-click-and-go interface. When the cursor turns into a little hand or changes colour on screen, a click will instantly whisk you off to another WWW site, or perhaps play a sound file. The Net, as an even bigger entity, is made up of a whole range of special-purpose tools (including the Web and its browsers), which, since the earliest days of data exchange between universities and research labs, have been created for specific tasks.

Now the whole world wants to use the Internet, and the tool of choice has become the Web browser. Browsers take care of all the interpreting between your connection to the ISP (Internet service provider) and your screen. They allow the user to info-nibble as they wander about the field of data that rests on servers dotted about the globe. Browsers, and their associated Web servers, make the Web what it is — but they are only part of the Net. Some older browsers are based on early Net technology and only provide text from any site, and others are unable to display frames or audio. Calling the Web the Net is a bit

EMAIL SHOULD BE LIKE A SWISS ARMY KNIFE — USEFUL, FUN AND PORTABLE.

Managing your email

By Josh Gliddon

There is such a thing as too much email, and usually it's caused by spam. Spam is a real threat to the stability of the Internet, and to the sanity of a large proportion of Net users. Software robots called spambots trawl the Internet, harvesting email addresses which are promptly compiled into mailing lists, and are then used to flog everything from hair-growth treatments to pornographic services.

While there are widespread rumblings about making spam illegal — a similar problem with spam faxes back in the '80s was defeated by legislation — it's unlikely there will be any action soon. ISPs take a dim view of spam, since it tends to clog up their links to the Internet and their mail servers, and most include antispam criteria in their conditions of use.

The architecture and ethos of the Net makes it easy for spam peddlers to simply pull up stumps and set up somewhere else if they're discovered, and as developing nations get jacked into the Net, the problem is likely to increase. What this means is that the best defence against spam is to take practical steps to filter incoming email and thwart spambots.

But I just want to get email!

Internet Explorer and Netscape Communicator both come with mail tools. Microsoft's Outlook Express and Netscape Messenger will have you up and running as soon as you've entered your ISP details into the relevant dialog boxes. In fact, for most users, IE's or Netscape's mail client is more than adequate for day-to-day email jobs.

If you're after a more powerful email client, there are a number of independent ones available, such as Eudora and the New Zealand-developed Pegasus Mail.

Business users also have the option of using groupware applications, such as Lotus Notes or Novell GroupWise, which also incorporate calendars, scheduling, workflow and document management. These packages are too expensive and complex for the average user, and IE and Communicator both incorporate reasonably powerful groupware functionality.

Email wanderlust

Freemail is perfect for travellers who need to keep in email contact with home. And true to its name, freemail is actually free. There are many vendors offering freemail (see 'Freemail' below), all of which operate in basically the same way. First, you need to access the Web and go to the vendor's site. Sign up, nominate a password and a user ID, tell everyone your email address, and you're ready to hit the road.

Accessing your freemail is as easy (or as hard) as finding a computer connected to the Web, accessing the freemail site and logging in. Once you're there you can check your mail, send and reply to email and allocate folders in which to store your mail.

Freemail can have two other important uses: first, assuming the vendor doesn't go out of business, a freemail address is an email address for life. This is useful if you shift employers or ISPs. Second, a freemail address can be a good insulation against spam if you use an account to sign up to mailing lists, post to newsgroups or register at corporate Internet sites.◆

WHERE TO GET EMAIL TOOLS

The Internet SuperGuide CD includes a range of mail clients and tools, newsreaders and antispam tools. Just click on **Email Tools**. Also included in this section is **'Do that again and I'll e-slap you'**, which defines the six golden rules of online behaviour.

FREEMAIL

Hotmail is the best known and longest running of all the freemail sites and has 9 *million* members. Microsoft recently purchased Hotmail, but there are no plans to take away Hotmail's freemail capacity.
http://www.hotmail.com

Juno is freemail with a twist: you don't even need an Internet account to take advantage of it. Juno works by using a proprietary client to dial directly into Juno's network. At the moment the service is only available in the US, although it may be expanded to cover international areas.
http://www.juno.com

Time Warner's mega **Pathfinder** site also gives you the option of paying for a premium service, which will forward your pathfinder mail to any Internet address in the world. This site is bandwidth-heavy and takes longer to load than Hotmail.
http://www.pathfinder.com

Bigfoot also offers Web site URL redirection, which is useful if your site gets tossed off one ISP to another. Its tidy interface and speedy loading make it a worthy alternative to Hotmail.
http://www.bigfoot.com

RocketMail, **Four11** and **Yahoo** have banded together to offer freemail addresses at yahoo.com. RocketMail tends to be a little slower loading than some of the other sites, but performs adequately once the page arrives at your machine. A busier design than Bigfoot, but no less useful.
http://www.rocketmail.com

THE URL ON THE TV SCREEN DURING A RECENT '60 MINUTES' WAS THE WRITING ON THE WALL. AS A CONSUMER COMMODITY, THE NET HAS ARRIVED.

Preaching to the masses

By Helen Dancer

It's not just '60 Minutes'. 'Burke's Backyard' advertises its Web site as a way of giving viewers more information about the plants and animals featured on the program. If you're not fast enough to write down Ian Parmenter's recipe on his Sunday night ABC cooking show, there's a Web address for him as well. You can even email Peter Cundall at 'Gardening Australia' with your gardening queries.

It's not simply that URLs have attached themselves to TV programs, but the fact that such programs are aimed at a mainstream audience that marks a move forward.

After all, Web addresses have been slowly creeping into TV and side-of-the-bus ads for some time now. Interestingly, however, it hasn't just been vendors in the technology industry who want to tell us where they live in cyberspace. In recent times, high-profile sports shoes, snack foods, soft drinks and other fashionable consumer goods have also been hurling their Net credentials at us as a way of validating their coolness.

These companies' drive to appear Net-savvy, however, has been more a token of their efforts to appeal to young, trendy, high disposable income earners than a response to the growing acceptance of the Net.

But the appearance of URLs on broad-spectrum consumer commodities such as popular TV programs signals that the Net has assumed a substantial portion of everyday mind-space.

Suburbia becomes cyburbia

We are getting to the stage where, for all its slowness and clunkiness, the Net is becoming the first resource we think of. How many people, sitting at their desks at work, stand up and walk across the room to pick up the White Pages rather than go straight to http://www.whitepages .com.au to find the number? Certainly not anyone in this office. In studying the way children approach school projects we've found that if they have Net access at hand, it's the first port of call. If they think about the library, it's more often to use the computers than the books.

However, much the Net changes our access to resources, it has the capacity to subtly change our expectations, and in equal measure. For those of us who can remember back to the days before visual computing (yes, Wang green screens, numbered menus and two choices of printing font!) Windows was a revelation. My first mouse contact was an unsettling experience. I couldn't believe that the phenomenon would catch on. After all, it took so much longer to take your hand off the keyboard, make the pointer go in the right direction and click, than simply pressing a couple of keys, that, surely, nobody would bother.

Not so. The mouse and the graphical user interface have become such an integral part of our computing experience, in a relatively short space of time, that no vendor would dare try selling a system without one.

The Net is the same. A year from now, it will be unheard of for companies to package consumer systems without Net access. It's still considered a bonus, but we're getting there. Of the two pre-Christmas PC purchases I was involved in, the first didn't include Net access, the second did. Next Christmas, I'd venture to suggest, the scenario will be entirely different.

The other expectation of the Net is that it is at least as credible a source as other published sources. Current publishing models carry an expectation of credibility based on their accountability. Books have long lead times and publishers behind them. Huge distribution costs are involved, making it unlikely that an enterprise would undertake to publish something that it knew to be spurious. TV programming lives and dies by ratings, so credibility, newsworthiness and entertainment value should be high on a program director's agenda. But when it comes to the Net, the same imperative doesn't automatically exist.

In an environment of low-cost infrastructure and massive distribution opportunities, Web sites can spring up, make claims, and quietly fade away. Five thousand can become 50,000 at the flick of a key. There may be no intention to mislead, but the potential for bad business decisions to be made based on ephemera is massive.

Ideally, the Web would also effect a change in the way we consume — and teach our children to consume — information. This won't happen overnight, however.

In the meantime, the immediacy with which we can consume represents another quantum leap in media development. The Vietnam war was the first conflict to be televised; CNN made a name for itself during the Iraqi war by furnishing the world with 24-hour coverage. If, God forbid, war were to come again, the ABC News site reminds us that it will be the Net's first war. A milestone of dubious distinction.

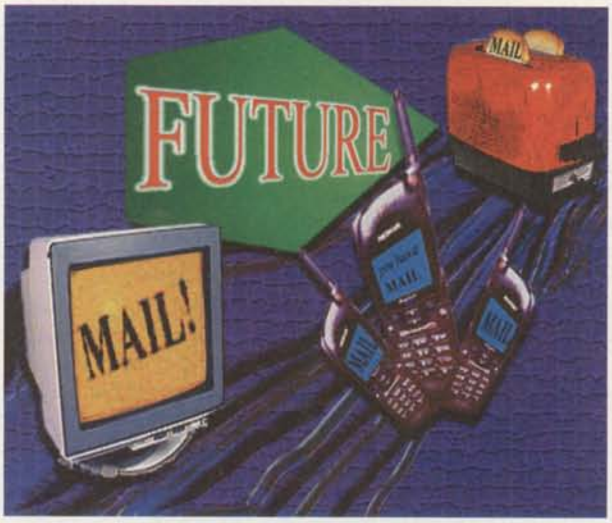
Yes, cyberspace is infinite. And there's every sign it's just around the corner. ◆

THE NEXT FIVE YEARS WILL SEE THE INTERNET FACE ITS MOST IMPORTANT PERIOD OF GROWTH SINCE THE ORIGINAL NETWORK CONCEPTION.

The Net's puberty blues

By Dan Tebbutt

In five years' time the Net will, hopefully, bear little resemblance to the crawling, buggy, inconsistent timetrap we tolerate today. But in order to reach new levels of maturity, the network must deal with the tough choices faced by every adolescent. From an end-user perspective, the most noticeable locus of change will be Net access. Meanwhile, service providers will encounter strange new sensations as their infrastructure matures into a fully fledged information conduit. Both areas will fundamentally alter during the Internet's puberty.



Forget analog. The future of access is all digital. Whichever local loop technology proves most cost-effective for carriers, we will eventually enjoy an unabridged digital connection from our homes to the world. Professor David Payne, an English academic recognised as the leading authority on fibre optics, believes bandwidth will explode as the technology extends beyond its current backbone application and reaches directly into the local loop.

What speeds we'll enjoy is anyone's guess, but it's fair to suppose we will have an asymmetrical architecture. This means more bandwidth coming into the home than going out. Some may complain that this limits an individual's capacity to operate Web servers, but the reality is that most people download a whole lot more than they send. Where we access the network from will change radically, too. The Internet will be liberated from its geeky PC cage. Net-connected information kiosks will appear everywhere to provide convenient access to Web and email services wherever you may roam. For businesses and organisations of every size, Net access will become essential. Many institutions will relinquish their own expensive private network infrastructure and use the public Internet as a low-cost virtual private network (VPN), tunnelling encrypted data between offices and out to teleworkers.

Towards a new network design

It isn't only the face of the Net that will change; behind the scenes its entire body will be transformed, as next-generation infrastructure is deployed.

Wasteful network usage will start to abate, due to both new technology and an increasing tendency towards volume-based charging. Greater caching, for example, will reduce needlessly repeated transfer of the same data files. The ISP-based proxies in use today will be superseded by Web caches built into the network's physical architecture, according to Bruce Nelson, chief scientist for router kingpin Cisco.

Constant demand for network capacity will drive telcos to install ever more bandwidth over coming years. We are unlikely to run out of physical capacity; Payne estimates that currently the entire Internet traffic load could be pumped down a single fibre strand. New techniques such as wave division multiplexing (WDM) can carry vast amounts of data with reasonable upgrade costs. The biggest bandwidth impediments are actually non-technical: the development of ISP business models to fund new capacity, and government regulations that control fibre usage and charging.

One stress point demanding action is Internet routers. Because routers actually examine every IP datagram, each router slows down overall performance. Constant Internet growth means data must pass through more routers to reach its destination; once 10 hops was normal, but packets now generally require more than 20 hops to traverse the Net. Solutions are available, but it remains to be seen which ones will prevail. Eventually, it's likely that we will use traditional routing only to start packets flowing through a faster switched network core.

Proof of these infrastructure changes will stem from new capabilities such as guaranteed quality of service (QoS). QoS underpins expectations about futuristic network services like video, interactive banking and business-to-business commerce. Technical challenges are not the only obstacle: ISPs will need to develop sophisticated service level agreements and billing. Internet-wide QoS probably remains decades away.

All this may seem like a lot of change, but each step will be necessary to match content projections. Our younger peers and children will expect the network to deliver video multicasts, CD-quality sound, telephony for Web applications, pushed subscription software updates and downloadable applets. To cope with such a radical transformation, the Net will need a very sound skeleton.◆

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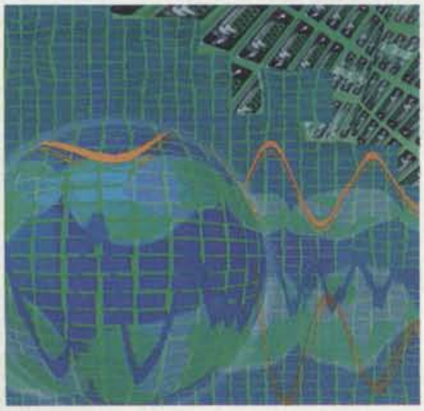

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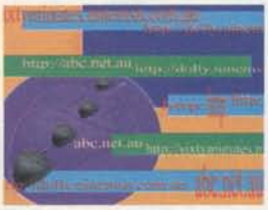

The **Internet SuperGuide CD** on the front cover includes a whole host of software to help make the Internet work for you. As a special bonus with this issue, we have also included a range of extra features on the CD.

These include an **ISP Database**, the most up-to-date and comprehensive listing of ISPs throughout Australia; an **Internet Glossary**, definitions of all the most crucial Net-related terms; and additional articles on search functions and resources, and Netiquette.

A complete list of contents is on the CD. For information on how to run the CD see 'CD Information', page 217.

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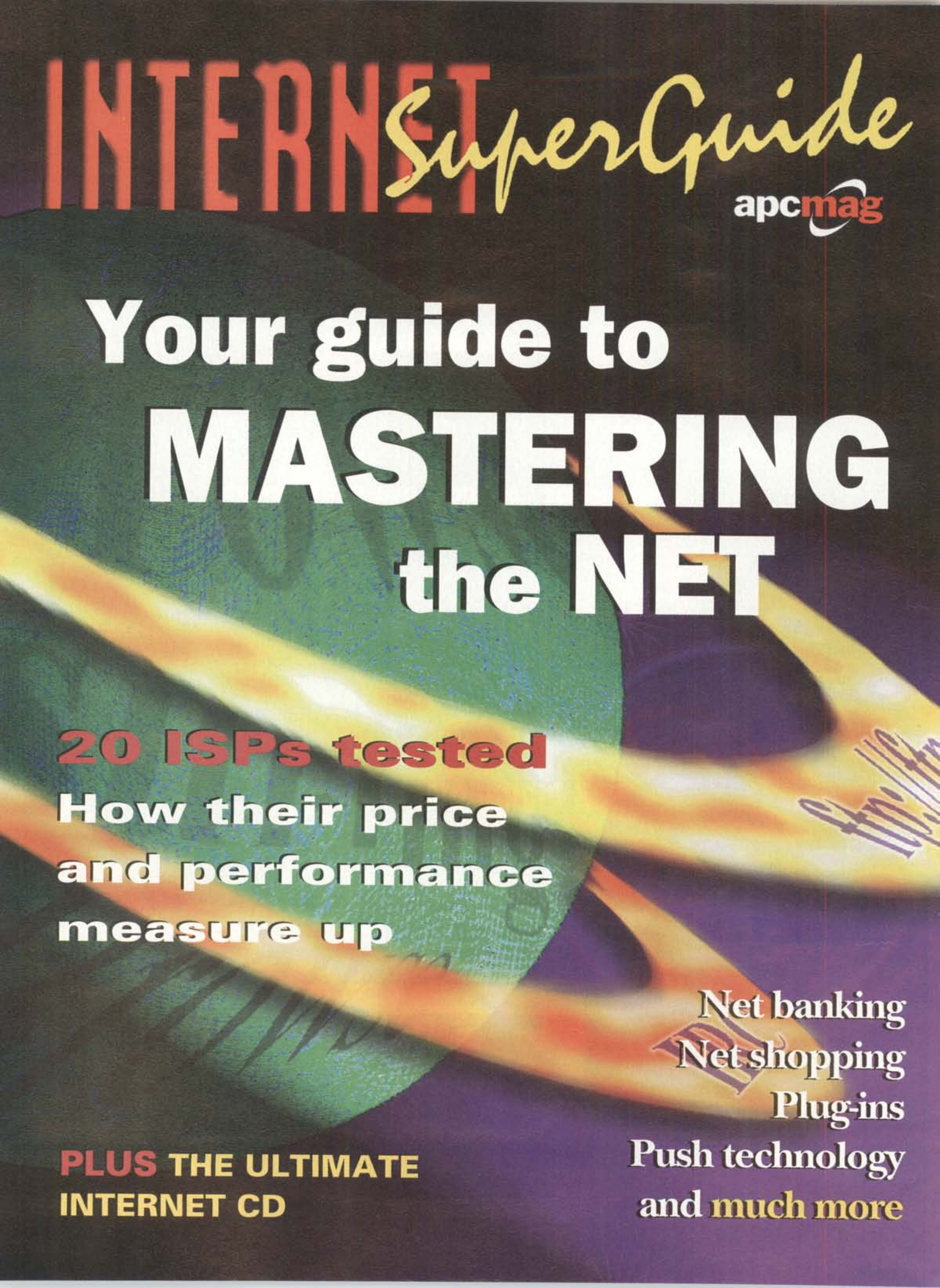

INTERNET SuperGuide

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Your guide to MASTERING the NET

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Net shopping
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user, many online commerce sites will store your details on a separate secure server so you don't have to keep resending them. The Internet also provides a great opportunity to do some spying of your own. There are chat groups that you can access to discuss which online stores are safest to use.

Another protocol being developed with the backing of the major credit-card companies and banks is Secure Electronic Transactions (SET), which authenticates customers and encrypts data, and is thus termed an end-to-end solution. Pilots using Version 1.0 of the protocol are under way, and Version 2.0 is also being developed. The latter uses digital signatures to secure transactions. Once implemented, it is hoped SET will provide a universal framework for the banks, but this probably will not occur until 2000.

If you want to wait until transactions are more secure, and many retailers are doing so, there are still many opportunities open to you. Searching for information online, making purchasing decisions, and then going to a local store to buy the goods is still a common way of shopping online.

Let's go shopping

Computers, books, entertainment, music and travel are the most frequently purchased products on the Net, but there are also opportunities to purchase clothes, food and more. So where do you find what you're looking for? You can either go to a specific site, such as Amazon or Dymocks for books, or a mall that offers a range of shops on the one site, such as Sofcom. If you are interested in browsing and researching purchases, the possibilities are endless. Traditional classifieds papers, such as *The Trading Post* and *The Sydney Morning Herald* are also online. (See 'Places to start' on the right.)

Tax time

As the number of people turning to the Net for goods and services increases, so too does the potential for the Australian government to lose revenue. Unlike physical shops and businesses, which are subject to a strictly policed tax regime, Net transactions are not so easy to monitor, particularly those where consumers are buying a service.

Whether buying a product by mail order, on the Net, or from a physical shop, all goods are subject to sales tax, which varies depending on the type of product. All goods entering the country include a customs declaration stating their worth. Generally, purchases above about $200 will be subject to duties. (Customs considers small amounts of duties not worth chasing up.) Obviously, any goods bought online from Australian companies will already include sales tax in the purchase price.

The global conundrum of what to do in the long term about taxes on the Internet is still hotly debated worldwide. One proposal is to keep Internet trade tax-free, another is to transfer the existing tax regime to cover the Internet. Most analysts agree, however, that the tax base needs to be redefined for borderless commerce. The CSIRO's *Internet Report*, commissioned by the Australian Tax Office (ATO), suggested online merchants be licensed, and that managers of online malls report information to the tax office about businesses that are offering commerce services. The ATO produced a report, *Tax and the Internet*, last year, which outlined the need for an international approach to the issue.

Until the final details are settled, take into account the cost of duties when purchasing from overseas, or keep purchases below the $200 limit.◆

PLACES TO START

The Trading Post
http://www.tradingpost.com.au
Search all the listings from *The Trading Post* by area or category.

News Classifieds
http://www.newsclassifieds.com.au
Search and browse the classifieds of the News Limited group of newspapers.

Fairfax@Market
http://www.market.fairfax.com.au
Lists all of the classifieds from the Fairfax group of newspapers.

Sofcom Shopping Mall
http://www.sofcom.com.au/mall
Information on a host of shops, providing everything from clothes to diving classes.

Shop.com.au
http://www.shop.com.au
Another central repository for myriad shops.

Auscity.com.au
http://auscity.com.au/cgi-bin/mall/shop/store.cgi
Links to lots of uniquely Australian products.

All Australian Shopping Mall
http://www.allaust.com.au/mall
A more limited selection of shops, many from the Northern Territory.

Telstra Surelink
http://www.surelink.com.au
A relatively new home shopping site.

Harris Technology
http://www.ht.com.au
Sells computers and related products.

Realnet
http://www.realnet.com.au
Real estate listings.

Greengrocer.com.au
http://greengrocer.com.au
Fruit and vegetable deliveries, Sydney only.

Plaza Home Internet Shopping
http://plaza.bhcons.com.au
Grocery home ordering for many Australian regions.

Amazon books
http://amazon.com

Bibliocity
http://www.bibliocity.com

Dymocks
http://www.dymocks.com.au

Music Boulevard
http://www.musicblvd.com

CDnow
http://cdnow.com

Gateway
http://gw2k.com.au

Dell
http://www.dell.com.au

Overseas malls:
http://www.cybershop.com
http://www.internet-mall.com/index.html
http://www.coolshopping.com
http://www.imall.com
http://www.emall.com
http://www.outpost.com
http://www.netscape.com/netcenter

ONLINE BANKING IS INCREASING IN POPULARITY, BUT WHICH SERVICE IS RIGHT FOR YOU?

Banking on the Net

By Selina Mitchell

Banks are moving away from using the Internet solely as a means of promoting brand awareness, to offering Net services ranging from online loan applications to complete account management facilities.

For banks, the Internet is a relatively cheap way to provide customer services, and for the rest of us busy folk, we are told, it lets us access our accounts when it suits us from wherever we may be — home, work, interstate or overseas. Some banks are even offering cheaper rates if you choose to use the Net for services that are available both online and face-to-face.

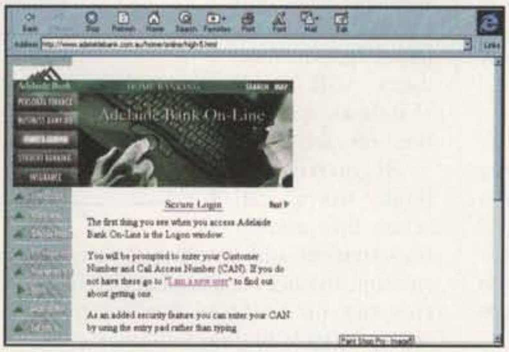
Last year Booz, Allen & Hamilton predicted that by 2000, consumers would have access to 3,000 Internet banking sites globally — a fourfold increase on the number available at the time. It also stated that Australian suppliers of Internet banking were among the most sophisticated in the world. The Internet ranks as the top future distribution channel for retail banking, said the report. While today, even in Australia, the services may appear limited, things are moving quite quickly, particularly for a sphere known for its conservatism.

The first Internet banking site was launched by Advance Bank in November 1995. Since then the majority of the major banks have either started online services or are in the process of developing sites. Most offer at least telephone banking, and regard this as the first step towards a Web-friendly approach to customer service.

For the banks, supplying online services is a win-win situation, said Gartner Group analyst Bruce McCabe. Banks can access even more customers, he said, while achieving cost efficiencies; they can continue to close branches but not be so concerned about losing customers.

Online banking is not, however, a win-win situation for consumers at this stage, said McCabe. It is very convenient and useful for those that have access to the necessary equipment, but that is still not the majority. The early adopters of Internet banking are those who are wealthy enough to have a PC and an Internet connection, and are computer literate.

As computing becomes more pervasive, online banking will be adopted by a wider section of the community, said McCabe. Until then, most customers (especially those with low incomes and small accounts) will have to use the old methods of accessing banking services face-to-face, or try their luck with telephone banking systems, which are sometimes frustrating and time-consuming.



Secure Login

The first thing you see when you access Adelaide Bank On-Line is the Logon window.

You will be prompted to enter your Customer Number and Call Access Number (CAN). If you do not have these go to "I am a new user" to find out about getting one.

As an added security feature you can enter your CAN by using the entry pad rather than typing

For those of us lucky enough to have online access at home or work, Internet banking is a reality. If your bank doesn't offer online services yet, it probably will soon, and if you can't wait, shop around and open up a new account with one that does. Certain fees apply to these accounts, like any others.

Those banks that are holding back on online services, such as the Colonial State Bank, are doing so because of security concerns, *APC* was told by a spokesperson from Colonial. However, McCabe does not see security as an issue that should concern consumers. Security is not perfect, he said, but Internet banking is probably safer than giving a credit-card number over the phone, or tapping in an account PIN in a public place.

So what do you need?

Besides the obvious PC, modem and ISP account, you will also need an account set up for phone access with the bank you wish to use. You will, in most cases, also need to download proprietary software from the bank's site. (So far only one site is browser-based.)

Most sites also offer security advice for customers. This includes: don't write down or reveal your password or access number; make sure the numbers are different to those you have for ATM access; regularly check your PC for viruses and your bank site for software upgrades and announcements; ensure you exit when you finish, especially if you're using the service at work; remove all programs from your hard drive if you abandon the service; and double check your statements.

Adelaide Bank On-Line

http://www.adelaidebank.com.au/home/online/high-0.html

While the big banks are trying to keep their existing numbers of customers through such services, the smaller, regional banks are using online banking to gather interstate customers without needing a base. Adelaide Bank has just released its service for customers with Windows 95 or NT installed.

To register with Adelaide Bank On-Line, customers need to print out the online form and post it to the bank's head office in South Australia. If you also wish to transfer funds to accounts not held with the Adelaide Bank, you will need to fill in another form. You will receive a customer number and a four-digit call access number. Once you have these, go to the site and launch the service. There is no need to download any software, as the system is browser-based, which makes it much easier to use.

Users can check account and loan balances, transfer funds between accounts and make payments to loan or credit-card accounts, pay bills to local and interstate institutions via BPay, order chequebooks, check transaction histories, and print and order records. All of these are done with point-and-click simplicity.

The bank uses encryption, firewalls and passwords for security. The applet needed to run the service is downloaded via Secure Sockets Layer.

St George Bank Internet Banking (previously Advance Bank)

http://www.stgeorge.com.au
http://www.banksa.com.au

The revamp of this site took place too late for *APC* to be able to review it, but representatives said for the moment the site would only change cosmetically to represent the demise of Advance and its integration into the St George group.

Advance Bank is a veteran online service provider, starting its service in 1995. The new banking group will soon move to a browser-based system, but in the meantime users need to download a Windows-based Internet banking program. If you are already a St George or Advance customer, you will need to register to have phone banking.

As well as your ATM card number, you will be provided with a PIN for phone and Internet banking. This will allow you to check balances and recent transactions on cheque, savings, Visa and loan accounts, including information on interest earned and histories (details vary depending on the account type); print account details; transfer funds between your own personal and business accounts with the bank; pay bills; transfer funds to other institutions; open up a term deposit; stop cheques; or buy ecash that can be spent in online malls. Account details can also be exported to accounting software packages.

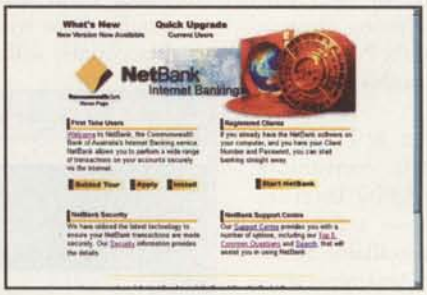
You are allowed to make five transactions for free (this includes both Internet and phone banking). Others will cost 20 cents per transaction (accounts which have home loan payments deducted directly are exempt from fees).

The bank uses 128-bit encryption. For security reasons, it upgrades programs regularly to change encryption keys. If you don't use the program for a while, it is probably best to check you have the latest version. Another bank in the St George group, BankSA, has its own Web site and online banking service.

Commonwealth Bank NetBank

http://www.commbank.com.au/Netbank/

NetBank, launched in February last year, was about to be upgraded when *APC* reviewed it. Many of the small problems found were to be corrected with Version 2.0 of the NetBank executable file that you need to download to access the basic online banking services.



Once set up with an account, client number and password (available by application), users download and install the NetBank software, which can be used on any Windows-based system. Mac users will need Windows emulation software.

Registered NetBank users can access information on statement and credit-card accounts. Account balances and transaction histories can be accessed for statement accounts, including tax and interest histories. With Version 1.0, users can only access account balance information on credit-card accounts, not transactions. Version 2.0 remedies this problem.

Funds transfers can only be made between linked Commonwealth Bank accounts. Transfers made from your credit-card account have a $50 minimum, and it's treated as a cash advance. While receipts can be copied with Version 1.0, Version 2.0 will also allow them to be printed. In some cases (after hours, for instance) it will take two business days for the transactions to register, so be careful.

Other features include a facility to order chequebooks and change your password, as well as pay bills. BPay will be introduced with Version 2.0. For personal accounts there is no joining fee; businesses need to pay $15. All users incur a 20-cent charge for each transaction.

The bank uses encryption, passwords and firewalls for security. It's working towards a browser-based system sometime next year.

How about the others?

The **ANZ**'s online banking service is expected to be up and running by April. Customers will be able to check account balances, transfer funds between their own accounts (but not between institutions), pay bills with BPay, view transaction histories and use an inbuilt financial planner. The browser-based service will be protected by a firewall, 128-bit encryption and a secure server.

Citibank intends to have a range of online banking services available by the end of 1998. At present you can fill in an online form for a mortgage.

A representative from **Colonial State Bank** said that it was not going to implement Internet banking until it was certain the security issues had been addressed. It does offer online applications for credit cards and personal loans.

Metway Bank is planning to launch its service. At the time of writing customers could apply for a home loan, personal loan or Visa card online.

At this stage, the **National Australia Bank** has opted to concentrate on its business customers, providing online account reporting, funds transfer, and direct payments to those businesses that purchase its National Online Business software for $75. Development work is being carried out on setting up a service for customers to bank online, but no dates or information on the rollout was available at the time of writing. A facility does exist for customers to apply for a home loan online.

Westpac plans a rollout of online services sometime this year, a spokesperson said. Customers can already apply for home loans and credit cards online, as well as register interest for more extensive online banking services. At the time of writing a system was being piloted with staff. Planned services include account balances, transaction details, funds transfer and BPay.◆

Setting our sites on Australia

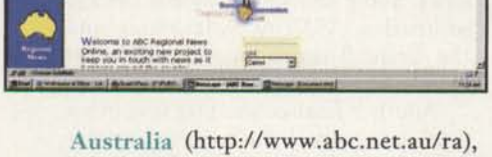
By Vanessa Richardson and Claire Waddell

Over the past few years, Australian sites have grown and adapted to changes in the Net, as well as the way people use it. We looked at some of the most popular kinds of local sites — those related to the media and finance, and also entertainment guides — and tested how useful they are.

ABC Online (http://www.abc.net.au) has drawn on the ABC's traditional strengths — its regional and educational focus and extensive overseas news network — to create this diverse and impressive collection of sites, ranging from the informative and educational to the purely entertaining.

ABC News has established a reputation as Australia's best news source on the Web, especially for its comprehensive coverage of Australia and the Asia-Pacific region. It's divided into State, World and Business pages, and includes an archive of in-depth features.

The World News is from **Radio Australia** (http://www.abc.net.au/ra), which is broadcast by shortwave and satellite in the Asia-Pacific region and is also streamed using RealAudio.



Welcome to ABC Regional News Online, an exciting new project to keep you in touch with news as it

The **Regional News Online** service (http://www.abc.net.au/news/regionals) is fed by most of the ABC's 42 regional newsrooms. Triple J has been streaming in stereo since February, but prefers listeners to use the radio, where possible, to allow access by a maximum number of people who are out of range of a transmitter.

TV program guides are available, along with synopses of highlights, and whole sites are devoted to some programs such as 'Recovery', and even past ABC productions, for example, the five-part series on drugs, 'What's Your Poison?'.

The ABC's science site, **The Lab**, (http://www.abc.net.au/science) contains transcripts of ABC science shows, segments from Dr Karl Kruszelnicki and Robyn Williams, and sections featuring scientific matters ranging from silly to earth shattering. It also links to major scientific events on the Net, like the global conference on the Public Understanding of Science which was under way at the time of writing. Such ambitious projects, even though they can experience technical obstacles, hint at the Net's potential to encourage the communication of useful information and ideas, something that tends to get lost in the proliferation of commercial sites.

The **SBS** site ('Australia's National Multicultural Broadcaster Online' at http://sbs.com.au) is a much more modest site than ABC Online, mainly serving as a guide to SBS radio and TV programming. The design is simple and straightforward, and includes useful features like a search for radio programs by language and links from many of the listed TV programs, to brief outlines followed by further links to related information on other sites.

The most developed part of the site is **The Movie Show Online** (http://www.sbs.com.au/movieshow). It has appeal for film lovers, including an archive of reviews (complete with David and Margaret's scores), as well as the week's interview in streamed audio, and clips from featured movies.

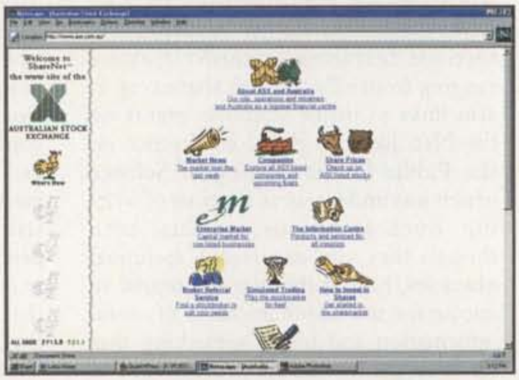
Fairfax sites such as **The Sydney Morning Herald Online** and **The Age Online** consist mainly of a selection of articles from their parents in print, and gimmicks such as "the world's first live online house auction", complete with real estate agency logos and bank banner ads. Registering as a member (it's "free of charge for an initial trial period") allows the dubious privilege of more search options on the **market@Fairfax** site, as well as use of the AdAlert service, which emails you lists of ads matching specific criteria. This seems to work best with job ads, especially if there are key words that always appear in the ads for jobs you are interested in. Real estate listings are more complicated. If your price range or suburb choice does not neatly match the given options, you will need to fill out multiple forms and wade through multiple lists of results (some of which are invariably irrelevant), or alternatively, resort to red texta circling on newspaper.

Part of the Fairfax push into Web publishing are its city guides — **City-Search: Melbourne** (http://melbourne.citysearch.com.au) and **Citysearch: Sydney** (http://sydney.citysearch.com.au). NineMSN's **Sydney Sidewalk** site (http://sydney.sidewalk.com.au) is CitySearch's only real competitor, but is only available in Sydney.

Sidewalk and Citysearch cover what's happening in Sydney and Melbourne — whether it be exhibitions, films, latest videos or live music. Both sites have regular features on places to go, major events and new cuisine, alongside endless restaurant and movie listings; but as with any directory, don't count on details such as pricing and times being accurate.

Both services provide customised email alerts of events you are interested in, so you will never miss your favourite act again. CitySearch's 'What else is nearby?' allows you to pick a movie and then find a restaurant nearby, or vice versa. Similarly, Sidewalk will locate anything from the nearest restaurant to the closest ATM or car park to your destination.

Sidewalk's search function also enables you to pinpoint a restaurant for a special occasion — you can check that the ambience, the price and the cuisine are right, and you can even look at the latest weather report, so you know whether to take an umbrella. CitySearch does not have extensive details on as many restaurants as Sidewalk, but it includes comprehensive menus and reviews. Searches can be frustratingly slow, so try not to leave your planning to the last minute. To make discerning choices, it's often best to use both sites.



Like most finance sites, Fairfax's **Trading Room** (http://www.tradingroom.com.au) provides free information such as closing share prices from the previous day, and the volume of shares traded for all securities listed on the ASX. If you want more specific information, such as live share prices or detailed historical records, you will have to pay.

The majority of finance sites have two levels of access: client (for registered members only) and public. Once you register with Trading Room, you can access free services such as Watchlist, which keeps an eye on potential investments, and Portfolio, which keeps track of what stock you hold and how much it's worth. You can also access other data for a fee, including live managed funds (fed from ASSIRT), foreign exchange rates from Dow Jones and the balance sheets of listed companies.

The site provides a comprehensive overview of the market, drawing on the vast resources of *The Sydney Morning Herald*, *The Australian Financial Review*, *The Age*, *BRW*, *Personal Investment*, and *Shares*. Articles from the past three months are archived and can be viewed for $2 each. You can view every company's announcement to the ASX as it is made, at a cost of 40 cents each.

Trading Room also displays the market turnover, as well as the big movers among the top 100 stocks and across the whole market. There is an overview of trade in warrants and derivatives and performance data on managed investments funds and cash investments.

If you are considering investing in shares for the first time, the Australian Stock Exchange Site **ASX Share Net** (http://www.asx.com.au) has lots of helpful information, including a glossary of sharemarket terms. You can test your speculating skills (without outlaying any cash), on the instant sharemarket game. There is a broker referral service which lists all the stockbroking firms in Australia, and the services they offer, as well as overseas brokers who deal in Australian shares. It also provides detailed daily market news reports.

The **Commonwealth Securities** (http://www.comsec.com.au) site has limited information for the public user; it mainly functions as an Internet stockbroking service. In the public domain, only the top 50 listed companies' share prices are listed, as well as the top 20 most active industrial and mining companies. The current prices and shares available in Aussie Shares packs are also shown. However, there is no search function to call up a particular share price. Registered clients of Commonwealth Securities can access live prices of all stocks and indices on the ASX and place online buy and sell orders.

The site links to NetBank —the **Commonwealth Bank's** (http://www.commbank.com.au/Netbank) Internet banking service, so clients can pay for shares online. It also links to **Economic Brief** (http:// www.commbank.com.au/today/frames_default.htm?s=1&n=1&b=Economic Brief&), a valuable resource consisting of research papers and daily and weekly economic commentaries. These documents are archived back to December 1995, and analyse everything from employment to the financial impact of the US-Iraqi conflict.

The Australian Financial Services Directory (AFSD) (http://www.afsd.com.au) is an informative site, providing a free service to the public (StockWATCH), and a daily Australian charting service to investors. There are over 2,500 charts covering ASX stocks, warrants, options and indices. StockWATCH can provide charting information over days, weeks, months or even years, depending upon availability of data. The site has numerous links to Australian financial institutions.

OzEmail's **STOCKWatch** (http://www.stockwatch.com.au) is available free of charge to OzEmail and Access One customers, but for other ISP customers it costs $19.95 per month. It allows you to record up to 50 stocks in a real-time portfolio manager. You can make unlimited real-time stock queries and ratio calculations. You receive portfolio emails on a daily, weekly or monthly basis, plus charts and market downloads and business news. Some indexes, including the all-ordinaries, ASX100, Asia listing and the Trans Tasman, are accessible for free.

Another finance site that is worth a visit, especially if you're in the market for a home loan, is **Your Mortgage Magazine** (http://www.yourmortgage.com.au). It displays current rates, and best deals for credit cards, term deposits and at-call deposits. It also has a calculator into which you can enter the terms of your loan, and it will then work out your monthly repayments.◆

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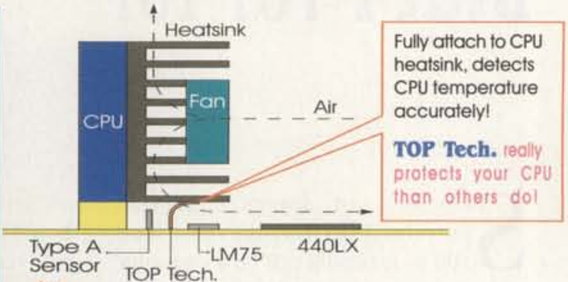

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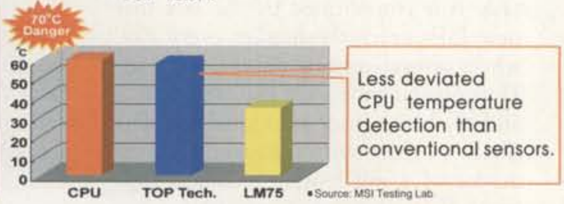

Less deviated CPU temperature detection than conventional sensors.

• Source: MSI Testing Lab

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- **Memory:** 4 DIMM. Max. 512MB SDRAM, or (Support ECC & EC)
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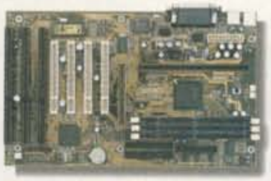
- **BIOS:** ACPI, DMI, PnP, Green
- **Slot:** 3 ISA, 4 PCI and 1 AGP. 30cmx22.5cm, ATX



MS-6119

Intel® 440BX AGPset ATX Mainboard

- **CPU:** Intel Pentium® II processor up to 450MHz
- **Memory:** 3 DIMM. Max. 384MB SDRAM, or 768MB EDO DRAM (Support ECC & EC)
- **I/O:** 2 Serial, 1 Printer, 2 USB ports, Floppy, IrDA
- **BIOS:** ACPI, DMI, PnP, Green
- **Slot:** 3 ISA, 4 PCI and 1 AGP. 30cmx18.6cm, ATX

MS-6120

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- Geometry processor enhance 3D performance

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- Polygon-based with Z buffer
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January, 1998

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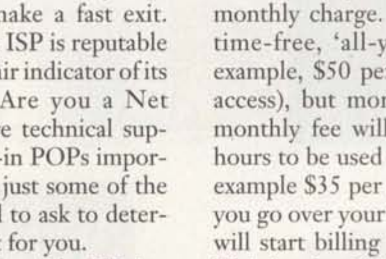
APC PUT 20 OF AUSTRALIA'S TOP ISPs TO THE TEST

Dial I for ISP

By Roulla Yiacoumi

Selecting an Internet service provider (ISP) from the more than 500 in Australia can be a daunting task. It is complicated by the fact that new ISPs enter the market every day, while several others make a fast exit. How do you know if an ISP is reputable and reliable? Is price a fair indicator of its likely performance? Are you a Net novice who will require technical support? Are multiple dial-in POPs important to you? These are just some of the questions you will need to ask to determine which ISP is right for you.

For many, finding the right ISP is a process of trial and error. Chances are the first ISP you try will not be the last. The industry is well known for its high 'churn' rate; it seems users have no loyalty to any particular ISP, preferring to use whichever one is offering the best deal and performance.



What does a great deal mean to you? Is it paying as little as possible for as many hours online as possible? Perhaps it means being able to connect at any time of the day or night without copping numerous engaged signals. You may want extra services, such as space for a Web page. (many ISPs offer a limited amount of Web space free with accounts). Once you work out your priorities, choosing an ISP becomes an easier task.

Let's start with cost. There are a number of different pricing plans offered by ISPs. Keep in mind that some ISPs may charge a set-up fee when you join — a one-off payment (usually around $25).

For those who don't really need the Internet for much besides reading email and checking out the odd Web page, the hourly rate can be the most cost-effective option. A standard hourly rate is about $5.

Monthly plans involve a higher flat monthly charge. The charge may be a time-free, 'all-you-can-eat' rate (for example, $50 per month for unlimited access), but more often than not, the monthly fee will include a number of hours to be used within that month, for example $35 per month for 20 hours. If you go over your allotted hours, the ISP will start billing you at an hourly rate. This is why it's important to do some calculations before committing yourself to a particular plan.

Some ISPs sell 'blocks' of hours with no time limit. For example, $120 for 120 hours to be used at your leisure. Although this kind of deal sounds great ($1 per hour) it means you must outlay the total amount upfront, and if the ISP goes out of business tomorrow, your chances of seeing that money again are slim.

Most ISPs include free technical support as part of their services, but others charge for it separately, usually at ludicrous rates, such as $1 per minute. When considering payment plans, check if and when technical support is included, particularly if you will need some help getting set up.

The cost of signing up with an ISP is just one consideration. How would you feel paying $20 for 20 hours if you got a busy signal almost every time you dialled into the ISP? This is one of the most common reasons users switch ISPs. A low user-to-modem ratio is ideal (for example, one modem for every eight to 10 registered users). As the demand for services grows, your ISP should increase the number of modems for users to dial into. However, if you were only paying $1 per hour, you might grit your teeth and put up with a few engaged signals. Be sure to check with an ISP what user-to-modem ratio it claims to have — before signing up. (As you can see in our table on page 160, some ISPs are sensitive about this subject, and refuse to reveal their user-to-modem ratios to prospective customers.)

Performance should be your next consideration. If you have to wait five or more minutes for a Web page to download, the ISP probably has serious system overload problems. Some ISPs 'piggyback' off a bigger ISP's lines. This is likely to result in compromised performance. ISPs with their own overseas backbone link may bypass Telstra's congested international backbone (Telstra Internet). Of course, even the best connection in the world can be slow if too many users are accessing the service at the one time.

In terms of modem speed, check the maximum dial-in speed the ISP supports in your area and ensure your brand of modem is compatible with the ISP's server. An incompatibility problem may mean either not being able to connect successfully, or a constant 'dropping out' (becoming disconnected) shortly after connecting.

If you frequently travel interstate or overseas, the number and location of the ISP's local points of presence (POPs) will be of interest to you. A local POP means you are able to dial into a server using a local number even when you are not in the country where you originally registered with your ISP. For example, if you are in London, you don't want to be dialling into your ISP in Sydney to check your email. Check your ISP has POPs in other countries if global roaming is important to you.

Even Australian residents who live outside capital cities should check there is a local call number for the ISP. With the recent changes to area codes in Australia, it may be difficult to tell if the number you are actually calling is a local call or not. If you have to make a long-distance call each time you connect to the ISP, the charges will outweigh any 'bargain' deal you might be getting. So check with Telstra and your ISP that the dial-in information is correct.

Another piece of information to check is the 'user agreement'. Most ISPs have their user agreements online so you can read the conditions of being a member before actually joining. It should outline what the user's rights are, as well as the ISP's. It is in your interests to carefully examine anything requiring you to click an 'I agree' button. For example, did you know that taking up an 'eight hours free' offer with an ISP may allow the provider to start billing you on a monthly basis once your eight hours are up, unless you send a letter explicitly stating that you wish to cancel the account?

Unfortunately, there are no guarantees to landing the perfect ISP, even if you follow all the tips listed here. *APC* receives several letters each month from readers complaining about incorrect or late billing, incorrectly charged credit-card accounts, sudden price hikes and cancellation of service without any reasonable explanation. Some of these complaints concern small ISPs, but there are also many about some of the larger players in the market. If you are unable to resolve any disputes with your ISP, the Telecommunications Industry Ombudsman (TIO) should be able to help. ISPs are now within its jurisdiction, as all Australian ISPs are required by law to join the TIO scheme. It should be remembered that the TIO is an office of last resort, so you must try to sort the problem out with the ISP first. The TIO can be contacted on 1800 062 058.

APC selected 20 of Australia's top ISPs to review, based on the number of users, modems and POPs. Each was subjected to a rigorous testing procedure to provide an accurate representation of its performance.

Take your time and research as much as you can before signing up with any ISP; making an incorrect decision can be a costly and time-consuming exercise. But with a little help, you can make a confident choice and be on your way to experiencing the weird and wonderful world of the Net.

ISPs IN REVIEW

Access One

Access One has consistently performed well in *APC*'s past annual ISP features. This time was no exception; it produced some very impressive results.

Connecting to Access One was a breeze — there were no failed connections out of 134 attempts. Access One boasts a user-to-modem ratio of 10:1, with a maximum dial-in speed of 33.6Kbps and 42 POPs around the country.

Ping response times to both the US and Australian sites were very good, as was the percentage of ping packet loss. Ping packet loss of 1% or less to all of the Australian sites was an outstanding result.

On the FTP front, 278.1 seconds from the US was on par with Telstra Big Pond's result, as was Access One's Australian FTP time of 208 seconds. Access One experienced 16 failed FTP retrievals to our US site and just two to the Australian site.

Following Access One's recent takeover by OzEmail, its pricing structure has been revised to fall in line with OzEmail's current pricing. The most popular plan is $39 per month for 20 hours. It now offers global roaming in over 150 countries. The ISP is now also known as OzEmail Access1.

Roulla Yiacoumi

■ Phone	1800 818 391
■ Online	http://www.aone.com.au
■ Services	Web hosting, virtual private networks, Web software development, Internet consulting.
■ In short	A great ISP and well worth the cost.

CompuServe

CompuServe is one of the world's largest ISPs, with more than 5 million members worldwide and a presence in over 185 countries. In February this year, fellow US provider America Online (AOL) bought CompuServe, and decided to retain it as a separate brand with the online services and content CompuServe had established.

In Australia, CompuServe is working hard to build up support for the local product in a competitive market. CompuServe's $14.50 per month charge, which includes just two hours, is incredibly steep. However, CompuServe is more than just an ISP. Its numerous other services include an online collection of databases to rival any library. Using its resources, you can conduct online searches of magazines, reports, encyclopedias and the like. Joining entitles users to 5M of Web space.

CompuServe may also be fighting an uphill battle trying to convince users that it's serious about performance. Looking at the ping response times, we found that CompuServe's ping time to our US site was 697ms — only two ISPs produced results worse than this. Similarly, its ping response times to all of the Australian sites were appalling, especially the result of 527ms to our fourth Australian site. Most of the other ISPs accessed the same site in less than half this time. Its ping times to both the US and Australian site were also among the poorest results. And as for packet loss, while its performance was not as bad as Geko's, for instance, you would expect better for such a pricey service.

CompuServe is expensive and its performance needs to improve if it expects to make a serious dent in the Australian marketplace.

Roulla Yiacoumi

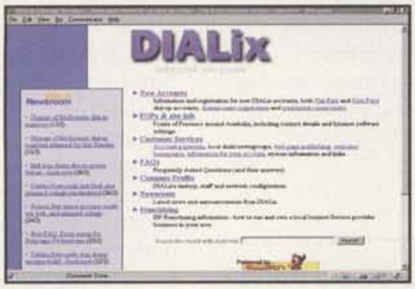
■ Phone	1300 555 520
■ Online	http://www.compuserve.com.au
■ Services	Web hosting, site management, Internet consulting and training, news, travel and reference services, electronic shopping mall.
■ In short	Not a great performer, and far too expensive to be a viable option for most Net users.

DIALix

As one of the oldest commercial Internet providers in Australia, DIALix's strength has always been its old-fashioned shell (Unix command-line) accounts. Today it offers an attractive flat-rate combined shell/PPP (modern standard) account.

There is still a healthy sense of Internet tradition on DIALix's systems, with attention to detail in the shell environment and it uses solid, familiar Unix server software. If you want to play with the Unix command line, DIALix provides a good opportunity to do so, but there's no compulsion to use anything so complicated.

In our testing (using the Sydney DIALix 'curie' access point), DIALix achieved passable FTP times and commendably low packet loss, but its average ping response times were on the slow side. Anyone using a chat service, playing online games, or accessing any other live service via this ISP might experience more 'lag' than their fellow users. DIALix is connected to Telstra Internet, which should make for better results, suggesting some congestion on DIALix's side.



DIALix did not provide us with details as to the speed of its network connections, but a spokesperson said a minimum of 64Kbps is provided per 16 modems. It primarily targets the consumer market, but offers a good standard of access for commercial users with basic requirements. DIALix has always handled user support well, via email and the dialix.hints newsgroup — even the company's owners still pitch in and help users. Phoning DIALix for inquiries or assistance costs $1 or $2 per minute, however.

If you are happy with a medium level of performance at a good price, DIALix might be just what you're after.

Simon Vandore

■ Phone	1902 292 004 ($1 per minute)
■ Online	http://www.dialix.com.au
■ Services	Web hosting, domain name registration, Unix shell accounts, site development, network integration, other LAN services, and Internet training.
■ In short	Average performance, but an old, reliable ISP with cheap pricing.

Enternet

Connect provides a major Australian Internet backbone through which several other ISPs receive their link to the outside world. Enternet is Connect's consumer-oriented service, offering dial-up access to its high-quality facilities at an hourly rate of $4. Its 20-hour plan, costing $40 per month, is consistent with a lot of the other ISPs' pricing.

With connections to all Australian backbones and its own US link (to the UUNet backbone), Enternet performed above average in ping and FTP tests. There were quite a few failed FTP transfers to the US, although packet loss performance was above average.

Enternet targets new Internet users and those who need high-quality access for short periods. Its Web site is an excellent base for learners. The Web site's promotion of online gaming could be a good moneyspinner for the company — you have been warned.

This is the kind of ISP which people enjoy for a while, but tend to leave when their Internet expertise and resultant bills start to grow. Business users can talk to Connect about permanent access options.

Enternet is a good ISP, but not quite the best. Trial access often comes packaged with a new modem purchase — give it a whirl and learn the online ropes.

Simon Vandore

■ Phone	1800 818 262
■ Online	http://www.enternet.com.au
■ Services	Online gaming, beginner's Web site.
■ In short	Aimed at getting people online, Enternet delivers good performance.

Geko

Despite the company stressing it does not oversell its bandwidth, the dire levels of packet loss experienced in our testing of Geko suggested heavily overloaded equipment. Back when Telstra's US link regularly lost 30% of its traffic, this level of performance was not uncommon, but in our tests Geko lost about a third of ping packets sent to any destination, local or overseas.

This does not bode well for file transfers (FTP); over a quarter of our test retrievals from the US, and 14.3% from within Australia failed to complete. It would also make audio and video streaming unusable, not to mention online games. Packet loss is also the likely cause of Geko's high trace times.

With ping responses that were nothing to shout about, Geko's only impressive result was its modem availability, with just a few failed connections. It was also an early adopter of K56Flex modem technology.

From its early start in the ISP market, Geko's user base has traditionally been younger consumers. It found favour early in the entertainment market, hosting radio stations and other music sites.

Geko has a very reasonable $40 per month for 240 hours account (with a maximum connection time of three hours to prevent anyone from treating it as a full-time connection). But there are better options at this price point, offering more reliable connections and similar amounts of online time.

Simon Vandore

■ Phone	(02) 9439 1999
■ Online	http://www.geko.net.au
■ Services	Web hosting and Internet training.
■ In short	An established ISP suffering from poor performance.

GigaNet

Overall GigaNet's performance was average to poor in most areas, and although the figures are not embarrassing, more should be expected from GigaNet at its price point. In particular, it performed below average in ping response tests, especially to Australian sites.

On the other hand, GigaNet's range of services is very impressive. This company is not just a source of Internet access or Web publishing, it's a genuine communication services provider, supplying everything from training, to hardware, and email interaction with other communications devices (such as faxes, pagers, and mobile phones). One of the services it pushes is integration with the digital Short Message Service (SMS) function on modern mobile phones.

GigaNet is on the Telstra Internet backbone, with 24 POPs throughout Australia. It doesn't offer many hours in its flat

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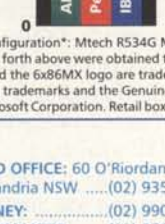

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monthly pricing plans, so expect to be paying extra if your Internet use grows.

GigaNet offers an impressive all-round package, but will need to improve its performance to keep pace with other ISPs.

Simon Vandore

■ Phone	1800 686 884
■ Online	http://www.giga.net.au
■ Services	Web hosting, training, communications integration, hardware, and SMS.
■ In short	Below average performance from an otherwise impressive ISP.

IBM Internet Connection

While the connect speed to most ISPs averaged 33.6Kbps, IBM Internet Connection only managed an average of 28Kbps over the testing period of three weeks.

While it managed to achieve the fastest ping response (462ms) of all the ISPs to the US, its ping packet loss to the US was below par. An average packet loss of 6.9% was certainly not the worst result of the bunch, but for a service you pay a premium for, it was quite high.

Ten dollars per month for three hours may not be an expensive plan, but $75 for 30 hours is very steep compared to some of the other ISPs in this review. A set-up fee of $25 applies to all plans. No Web server space is provided with the account.

Connecting to IBM wasn't a problem — we got through 126 times of the 134 connect attempts. On the other hand, the provider had 21 failed FTP retrievals to the US site and a more respectable five to the Australian site. Its trace time of 88.9 seconds to the US was definitely one of the highest figures, a reflection of the high packet loss value. Ping response and ping time results were average.

It has 13 POPs in Australia and global roaming is available in 52 countries. This ISP is expensive for heavy Net users but ideal for the person wanting to outlay just $10 per month to check their email once every few days.

Roulla Yiacoumi

■ Phone	1800 640 710
■ Online	http://www.ibm.net
■ Services	Web hosting, site management and development, network integration, Internet consulting and training.
■ In short	Expensive plans and average performance — but a cheap option for the minimal Net user.

Magna Data

Magna Data caters for the corporate access market, and from its POP locations (Sydney, Brisbane, Melbourne and Wollongong) you can see it concentrates on the major business centres. It claims a 5:1 user-to-modem ratio and is a good choice if you need a business dial-up account for logging in from home, or a corporate WAN connection to the Internet (and it offers a wide array of connection options). Its network consists of a pipe to the Global One network, and connections to Telstra Internet in both Sydney and Melbourne.

Magna Data performed well across the range of our tests, except for the ping tests that targeted OzEmail's site, which were below average. Its average ping response from the US was 464ms — the second fastest time of all ISPs tested. Magna Data provides 33.6Kbps dial-up access, but there is a limited number of plans.

Lachlan Botticchio

■ Phone	1300 365 036
■ Online	http://www.magna.com.au
■ Services	Consulting, domain name registration, IP address allocation, and secure Internet access.
■ In short	Magna Data performed well in our tests. An ISP that caters for corporate WAN customers.

magNET

A subsidiary company of Fairfax Press, magNET runs off the same network infrastructure as Access One and OzEmail. In our tests magNET's performance was very good. The percentages of packets lost from Australian sites were all 1% or less, and packet loss from the US site was also low at 1.9%.

The average ping response time from the US site, 474ms, was well above average, and the response times to the four Australian sites were consistently fast.

Like some of the other top performing ISPs, the time it took to download the FTP file from the US was above average but not one of the fastest. (magNET's US FTP time was 286.8 seconds, compared to Zip's 227.8 seconds.)

magNET representatives claim a user-to-modem ratio of 10:1, which was supported by the fact that there were no failed connections out of 134 dial-in attempts. Customers can access magNETthrough 42 POPs.

It is not one of the cheapest ISPs around, although its pricing is consistent with ISPs which deliver this high level of performance. You can chose from two plans: $19.95 per month for seven hours' access; or $39 per month for 20 hours.

Kieran McNamee

■ Phone	1800 809 164
■ Online	http://www.magnet.com.au
■ Services	Web design and development, Web hosting, customised software.
■ In short	magNET offers excellent performance at a reasonable price.

Microplex

An ISP that has been around for quite some time, Microplex has recently grown in size with the takeovers of AUS-Net and Pegasus. Offering access to most of Australia, with 43 POPs, and attractive pricing plans (such as $39 per month for 40 hours), Microplex is making a name for itself as one of the major competitors in the ISP market.

Microplex offers 56Kbps connectivity through K56Flex. Our test was limited to 33.6Kbps, but we were not able to get a full-speed connection every time — the average speed of connection was 31Kbps.

The ping response times for the four Australian sites were good, presumably because of Microplex's 8Mbit link with Telstra Internet. The better than average time of 271.6 seconds for the US FTP tests, and an acceptable packet loss to both the US and Australian sites, indicates a fast and relatively stable connection.

Of the US FTP connections made, 17 did not complete. In the Australian FTP tests, 11 were unsuccessful. These lost connections are not disastrous, although the number of unsuccessful FTPs for the Australian file is a little too high for comfort.

Before you look at the results table see 'A note on test results' on page 159, which explains why Microplex recorded 62 failed connects.

Kieran McNamee

■ Phone	(02) 9438 1234
■ Online	http://web.home.mpx.com.au
■ Services	Web development and housing, virtual private networks, consulting and programming services, multiplayer gaming, email services.
■ In short	Fairly good performance and attractive pricing.

Mira Networking

A relatively small ISP, Mira Networking was a surprisingly good performer in our tests. Mira Networking has only three POPs (Sydney, Melbourne and Brisbane), but it also has a global roaming service that allows you to dial in for the cost of a local call from hundreds of locations, in 52 countries. Mira Networking is equipped with K56Flex modems, and has a 'no busy signal policy', but this does not mean you will always get through (there were eight failed connections from 134 attempts in our test). Factors such as line quality, as well as availability of modems, also determine whether a connection can be made.

Mira Networking has a sturdy backbone made up of four 2Mbit links with Telstra and Access One. Prices are fairly reasonable; $65 per month for 40 hours is one of the most popular options.

In the ping tests Mira had a very small amount of packet loss; from the fourth Australian site there were no packets lost at all, a rare occurrence. The Australian ping response times were all faster than average.

The Australian FTP transfer time was 199.9 seconds, the second fastest time of the 20 ISPs tested. The fast transfer time, and the fact that all the Australian FTP attempts were successful, indicates Mira has a very good Australian connection.

Kieran McNamee

■ Phone	1300 360 080
■ Online	http://web.mira.net
■ Services	Web hosting, permanent corporate connections.
■ In short	Very good performance, but only a small number of POPs.

Netspace

In our tests Netspace performed well when connecting to Australian sites, but when grabbing information from the US it took a little longer than the average. Netspace had a good connection record — out of the 134 times our test system dialled into Netspace's modem pool, it only failed to connect twice. Netspace's performance results were better than the group's average. The only notable exception was the results of the ping tests to the US; Netspace's were poor compared to the other ISPs.

Dial-up users can access Netspace from all Australia's major capital cities, as well as some smaller regional centres. At the time of writing, Netspace supported the K56Flex modem protocol from all its POPs.

Netspace splits its Internet services into three categories of use: business, educational, and hobbyist. Each type of account provides different pricing and usage options to suit different people. Netspace offers business customers permanent modem or ISDN connections, as well as Web site hosting.

In Melbourne, Netspace is connected to both Telstra and Connect's backbones, while in Sydney its connections go through UUNet and Connect.

Lachlan Botticchio

■ Phone	1300 360 025
■ Online	http://www.netspace.com.au
■ Services	Web hosting, Web design, consulting, domain name registration and secure transactions.
■ In short	Netspace is primarily a dial-up ISP. Good local performance was offset by poor US response times.

One.Net

Telecommunications company One.Tel now has its own offshoot ISP, One.Net, providing bulk access for users at a price few ISPs can match. Its basic plan costs metropolitan users $19.95 per month for 50 hours' access, or regional users $29.95 for the same service. Its dial-up lines were fairly uncongested — we had only 16 connection failures out of 134 attempts.

In our tests, One.Net achieved mixed results. Ping response was a little above average. However, high ping packet losses were incurred, suggesting One.Net's equipment may have been overloaded. About 15% of packets were lost in downloads from both US and Australian sites.

One.Net's FTP time from the US site was marginally below average, while the failure of FTP retrievals was a bit high; 27.1% failed from the US site, and 12.7% from the Australian sites. Combined with a slow average trace time this indicated One.Net had poor connectivity to the US, despite its claimed 10Mbps US link.

Claire Waddell

■ Phone	1300 303 312
■ Online	http://www.one.net.au
■ Services	Web hosting, Web design, domain name registration, and free Multiplay.
■ In short	An average performer; its equipment is possibly a bit too overloaded.

OzEmail

After its loudly trumpeted stock float, OzEmail has become Australia's Internet success story, and its recent acquisition of Access One gives the ISP one of the largest network connections in Australia.

OzEmail has 38 POPs throughout Australia, including all capital cities and

regional centres. Under the spotlight of our dial-up tests, OzEmail performed very well. All its results were in the top 20% in terms of speed and reliability. All the ping test times were above average. Failed connections occurred 10 times out of 134 connection attempts.

OzEmail's primary network connection is a 104Mbit link to Telstra Internet, and a 2Mbit link to the US via UUNet. Now OzEmail also has a connection through Access One's nationwide network.

OzEmail provides 56Kbps access with both x2 and K56Flex options in Sydney, Melbourne and Brisbane, via separate phone numbers. It offers both business and home user dial-up accounts as well as the full gamut of corporate services.

While OzEmail may be slightly pricier than other ISPs in the market, it does offer wide coverage, and a level of services that is hard to beat.

Lachlan Botticchio

■ Phone	1800 805 874
■ Online	http://www.ozemail.com.au
■ Services	Virtual Web hosting, domain name registration, intranets and ecommerce solutions, and OzEmail Phone.
■ In short	OzEmail has a speedy network as is fitting for one of Australia's largest ISPs.

Planet Internet

Planet Internet was founded in 1995, and has since grown to be a medium-sized ISP. It has four POPs (Sydney, Melbourne, Brisbane and Adelaide), and supports connection speeds of up to 56Kbps using the K56Flex modem standard, as well as 64Kbps dial-up ISDN.

Planet Internet would not disclose any information about its backbone connections. Its performance was below average in both the ping time and ping response tests. On the other hand it suffered minimal packet loss from both the US and the Australian sites. Planet Internet's modem bank was rarely full — our test system connection failed only six times out of 134.

Planet Internet has seven different pricing plans available for dial-up connections.

Lachlan Botticchio

■ Phone	1300 364 345
■ Online	http://www.planet.com.au
■ Services	Corporate WAN connectivity, Web site hosting, consulting and training, and a Kali game server.
■ In short	A medium-sized ISP with only four POPs, all in major capital cities.

Switch

Switch specialises in telecommunications services for small to medium businesses, and as part of this provides Internet access. Connection proved no problem for Switch; with no failures occurring in 134 attempts.

It only has five POPs: Sydney, Adelaide, Perth, Brisbane and Melbourne. It offers permanent connections and dial-up accounts on both modem connections and 64Kbps ISDN (managed or unmanaged). Switch also offers Microsoft Mail and Lotus cc:Mail integration. However, the plans are fairly expensive, and it did not deliver the quality you would expect for $25 for 10 hours' access per month.

Our test results indicated Switch had good connectivity in Australia but had serious problems with its links to the US. Its average trace time to the US was much slower than any other ISP's, due to very high packet losses. This indicates heavily overloaded connections to the US. A high number of ping packets failed to reach their destination, with an average of 11% lost in the US site test. Switch had the highest number of failed FTP retrievals of all ISPs tested — 78 failures from the US site and 75 from the Australian sites. One.Net and TPG Internet were the closest to Switch in terms of failed FTP retrievals, but still only registered 15 and 22 respectively within Australia.

Switch's good Australian connectivity was reflected in fairly good ping responses and consistently average packet losses from Australian sites, although its results were not as good as some of the other ISPs tested.

Claire Waddell

■ Phone	1800 641 934
■ Online	http://www.switch.net.au
■ Services	Electronic shopping mall, Web hosting, Web design, domain name registration, shared virtual Web services, and 24-hour support.
■ In short	A mixed performer, but expensive considering its poor connectivity to the US.

Telstra Big Pond Home

As one of the largest ISPs, serving over 80,000 users, Telstra Big Pond Home reaches a wide area through its 64 POPs. K56Flex is fully supported, and x2 access is available in Sydney, Melbourne and Brisbane.

In all *APC's* tests Big Pond recorded above average performance to both Australian and US locations, although it was not in the top two for any tests. Relatively few failed connections were recorded: 12 out of 134 test runs.

Its ping packet losses from the four Australian sites were between 1% and 2.4%, while 3.3% of ping packets were lost from the US site. This was an above average result. Ping responses from the Australian site were up to 145ms faster than the average. The US ping time was marginally faster than average, while ping time to Australian sites was between one and two seconds faster than average.

Big Pond recorded one of the fastest FTP times for the Australian sites. However, it was about 50 seconds slower than the fastest FTP time to the US site (although this still placed it just above average). A total of 18 failed US FTP retrievals were recorded higher than TIG and Zip's results of six, but on a par with most of the other ISPs.

Four different monthly plans are

available, ranging from $9.90 for three hours, to $80 for 50 hours. For those outside local call zones it has the Rural Connect Plan which avoids long-distance call charges, but is more expensive at $14 per month for two hours plus $7 per hour thereafter. As well as dial-up access, Big Pond offers 64Kbps ISDN accounts.

Claire Waddell

■ Phone	1800 804 282
■ Online	http://www.bigpond.com.au
■ Services	Web hosting and personal home pages.
■ In short	Consistently good performer.

TIG

TIG is a fairly small ISP with POPs in Sydney and Melbourne, and it only offers PPP dial-up and 64Kbps ISDN accounts. It's one of the few ISPs still offering unlimited access. Most of the larger ISPs have phased out unlimited access plans because some customers used the services as permanent connections.

Thirty-eight percent of connection attempts to TIG failed, indicating its dial-up lines are too congested to reliably provide access, although we were assured new lines were being added. However, if it's cheap access you're after, you might overlook some of TIG's access connection problems. Pricing is very reasonable, just $27.95 per month for unlimited access, or a choice of three monthly plans ranging from 66 cents to $2 per hour, and accounts can be put on hold for up to three months. It also has a Kali and a Quake server.

In our testing, ping packet losses were quite high, indicating a poor or busy connection. In three out of five tests TIG had the slowest ping responses of all ISPs tested, about 320ms slower than the average. Similarly, it recorded the slowest ping time in two out of five tests.

TIG had the least number of failed FTP retrievals from the US sites of all ISPs tested, and the fourth fastest average FTP time. It performed reasonably well in the ping packet loss test from the US. It has a 34Mbit satellite link to the US. Ping time and ping response with the US site were below average, indicating it is a slow but stable link.

Claire Waddell

■ Phone	1800 353 700
■ Online	http://www.tig.com.au
■ Services	Web hosting, personal home pages, telehousing, domain name registration, IP addresses, secure commerce servers, online gaming, and Web advertising.
■ In short	Cheap access for reliable performance to US sites, but poor connectivity in Australia.

TPG Internet

TPG Internet provides access to a wide area, including all capital cities and many regional areas, with the highest number of POPs (51) after Big Pond. It offers reasonably priced dial-up access as well as 33.6Kbps permanent modem connections and 64Kbps ISDN accounts.

In our tests TPG Internet was a mixed performer. In terms of reliability of ping packet delivery it had a high percentage of losses, especially from the US site, suggesting its equipment might have been overloaded. Ping responses were nothing to rave about, and ping times were mostly faster than average, but only marginally. The biggest problem we found with TPG Internet was slow FTP times — it recorded the slowest times of all ISPs tested to both the US and Australian sites.

Its pricing plans are very competitive; it has yearly prepaid accounts, ranging from $150 for 120 hours (comprising 10 hours per month) to $500 for 600 hours (comprising 50 hours per month).

Claire Waddell

■ Phone	(02) 9850 0800
■ Online	http://www.tpgi.com.au
■ Services	Web hosting, Web design, domain name registration, online gaming.
■ In short	A mid-range performer, with very competitive pricing, and lots of POPs.

Zip

Dialling into Zip is definitely a test of patience. Of the 134 attempts to dial in, 52 (almost 40%) were unsuccessful, the worst result of all ISPs (see 'A note on the test results', page 159, for an explanation of why TPG Internet and Microplex recorded more failed connections). Zip claims to have an 8:1 user-to-modem ratio.

Previously well-known among Netheads for its cheap unlimited monthly account, Zip has moved to a slightly pricier model with the imposition of time restrictions. However, you would need to be a Net addict to use up 150 hours in one month with the $39 plan. By way of comparison, DIALix offers a $40 per month unlimited access account — and it produced just 18 failed connection attempts.

As a result of its recent merger with World Reach, Zip now offers a 'Premium' 56Kbps account, costing $42 per month for 100 hours. The company will now be known as Zip World. Zip's $50 set-up fee was the dearest of all the ISPs tested, but 5M of Web space is provided for users.

On the performance front, Zip produced varied results. Its ping response time to our US site was 725ms and its US ping time was 42.6 seconds — easily the poorest results of the bunch. Its packet loss to the US, however, was not that bad, with an average of 4.5%. Its ping results to Australian sites were a little better.

The ISP fared better in the FTP tests, recording some of the best results of all the ISPs tested. When we finally managed a successful connection, we experienced just six failed FTP transfers to our US site and just one to our Australian site.

Remember the test results are averaged from the number of successful connections; if we could have connected more often, the results may have provided a more accurate reflection of Zip's performance.

Roulla Yiacoumi

■ Phone	1300 655 577
■ Online	http://www.zip.net.au
■ Services	Web hosting, Web design, network integration, Internet training.
■ In short	A mixed performer for those on a budget — but you'll need to set your modem to auto-redial.

HOW WE TESTED

The ISP tests were carried out in *APC* Labs on a Digital Celebris GL 6200, a 32M Pentium Pro 200 machine with a SCSI subsystem, using a NetComm V.34 33.6Kbps modem. OS/2 Warp 4 was the operating system chosen to carry out the tests, because of its stability and access to the REXX language which the ISP testing programs were written in.

The REXX programs were specifically designed to execute a range of tests all day, every day, for three weeks. A total of 134 rounds of testing were conducted during this time (each ISP was dialled up 134 times), with each test round measuring ISP performance through 22 different variables. Over the three-week period, a total of 58,960 results were in 2,680 result files, all recorded with millisecond accuracy to three decimal places.

Another REXX program was specifically written to process these files and produce averages for each ISP. These results, listed in the 'ISP results table', accurately represent the performance of each of the ISPs tested. For the table, results given in seconds and percentages have been rounded to one decimal place, and milliseconds have been rounded to the nearest whole figure.

The results

In order to measure real-world performance, both within Australia and overseas, tests were carried out using four different Australian sites and one site on the east coast of the US. In addition, for the file transfer (FTP) tests we used a large public archive in the US (closer than the east coast site) and a mirror site in Australia. The following sites were used for testing.

US (Lotus)	206.34.80.250
AU1 (OzEmail)	203.108.7.7
AU2 (Connect)	203.63.84.156
AU3 (Access One)	203.12.176.149
AU4 (Telstra)	192.148.160.100
US FTP	ftp.cdrom.com
AU FTP	ftp.tas.gov.au

For the FTP transfers we used a 690K file (McAfee VirusScan for DOS, SCN3 14E.ZIP) is available on both FTP sites.

The results allow us to measure the performance and reliability of each ISP, and to pinpoint any problem areas an ISP might have. Testing covered the following categories:

Successful connects shows the number of times the modem successfully connected to the ISP. All averages are based on this value.

Failed connects shows the number of times the modem failed to connect. This may mean the ISP was engaged, although problems such as poor line quality can also cause modem handshaking to fail.

Connect speed shows an average of the connect speeds reported by the modem for all successful connects.

Ping packet loss is an overall reflection, as a percentage, of how congested the

ISP RESULTS TABLE

	Access One	CompuServe	DIALix	Enternet	Geko	GigaNet	IBM Internet Connection	Magna Data	magNET
Successful connects	134	120	116	125	126	121	126	117	134
Failed connects	0	14	18	9	8	13	8	17	0
Connection speed (Kbps)	33.6	33.6	33.6	33.6	33.6	33.6	28	33.6	33.6
Ping packet loss (%) — US	2.1	4.3	2.6	3.5	34.7	6.5	6.9	5.9	1.9
Ping packet loss (%) — AU1	0.5	10.7	0.6	0.7	32.0	4.8	8.5	6.5	1
Ping packet loss (%) — AU2	1	6.1	0.9	0.6	33.6	6.5	0.5	2.5	0.5
Ping packet loss (%) — AU3	0	8.7	2	0.9	32.9	7.6	1	2.2	0.1
Ping packet loss (%) — AU4	0.6	3	1.7	2.3	32.4	5.3	0.4	2.6	0.5
Ping response (ms) — US	473	697	601	544	476	582	462	464	474
Ping response (ms) — AU1	189	487	335	164	238	398	467	431	185
Ping response (ms) — AU2	184	619	315	171	254	335	209	214	182
Ping response (ms) — AU3	165	478	344	218	283	400	242	227	164
Ping response (ms) — AU4	187	527	310	173	263	388	213	180	188
Ping time (s) — US	37	40.9	39.9	38.9	34.5	38.7	36.6	36.7	37.1
Ping time (s) — AU1	30.3	38.7	32.7	29.7	30.5	34.4	36.4	35.7	30.1
Ping time (s) — AU2	30.3	40.2	32.9	29.9	30.7	33.7	31	30.8	30.3
Ping time (s) — AU3	29.7	39	33.2	31.2	31.2	34.4	31.5	31	29.6
Ping time (s) — AU4	30.4	40.7	32.7	29.9	30.8	34.5	31	30	30.5
Trace time (s) — US	51.5	67.5	59.5	38.9	95	66.6	88.9	42.5	51.6
FTP time (s) — US	278.1	238.1	298.9	258.2	340.6	368.7	341.4	291.4	286.8
FTP time (s) — AU	208	223.6	238.4	205.2	263.2	304.4	282.4	203.9	204.4
Failed FTP retrievals — US	16	17	17	22	37	20	21	14	16
Failed FTP retrievals — AU	2	6	4	1	18	3	5	1	3

ISP's link is to the respective US and Australian sites. The ping test sends out 25 packets, and measures the number of dropped packets and the average round-trip time it takes for packets to return. Packet loss is more likely to occur when contacting sites overseas, as congested networks and other conditions beyond the ISP's control can lead to packets going missing. A low value here means an ISP consistently provided a reliable link, whereas a high value reflects problems such as pauses and timeouts experienced while accessing the Internet.

Ping response is a measure in milliseconds of how fast the ISP's service is to the respective US and Australian sites. A fast response time means the ISP was able to deliver data quickly; while a slow response time is often indicative of a poor or busy link, sometimes also reflected in high packet loss.

Ping time shows how many seconds it took to complete the ping test for the US and Australian sites respectively. A fast ping response time and low number of dropped packets will produce a fast ping time.

Trace time shows how many seconds the trace to the US took to complete. The more routers (or 'hops') the packets must pass through, the longer the trace will take. The more hops that packets make in their travels, the greater chance there is of packets going missing. A long trace time is often a reflection of high packet loss.

FTP time is a real-world reflection of both the ping response and ping packet loss values. We measured how many seconds it took to retrieve our test file from the US FTP site and the Australian FTP site. FTP time is the average transfer time of the number of successful transfers, and accurately reflects the ISP's ability to provide an efficient service.

Failed FTP retrievals is a real-world reflection of the reliability of the ISP's service, measuring the number of FTP transfers that failed to complete due to problems such as timeouts and lost packets.

Ashton Mills

A NOTE ON THE TEST RESULTS

The test results for Microplex and TPG Internet are less representative of their performance than those for the other ISPs, due to problems that arose during our testing.

The test account for Microplex was accidentally disabled for a number of days during the test period, which resulted in a large failed connect value. We have disregarded this value for Microplex as it is not an accurate reflection of the ISP's connection rate.

Similarly, TPG Internet had a higher than normal failed connect rate due to a variation in the log-in procedure used with TPG Internet. Different log-in procedures would sometimes fail to trigger the log-in script and a connection could not be established.

Microplex	Mira Networking	Netspace	One.Net	OzEmail	Planet Internet	Switch	Telstra Big Pond	TIG	TPG Internet	Zip
72	126	132	118	124	128	134	122	83	75	82
N/A	8	2	16	10	6	0	12	51	N/A	52
31	33.6	33.6	33.6	33.6	33.6	33.6	33.6	33.6	27.36	33.6
4.4	1.1	4.7	15.4	1.9	1.1	11.1	3.3	6.2	13.2	4.5
0.5	0.5	1	14.5	0.4	0.7	12.5	2	8.1	6.8	6.9
2.3	1.6	0.9	15	1.4	0.5	4	1.8	9.8	7.7	2.1
1.4	2.4	2.5	15.8	1.1	0.4	3.3	2.4	13.4	7.8	1.8
2.2	0	0.5	14.1	1.2	1.5	3.2	1.1	10.7	7.5	1.3
602	510	628	533	493	626	527	529	711	534	725
214	222	208	272	145	410	495	183	650	271	631
227	205	197	255	184	426	232	198	608	283	254
266	204	222	284	168	411	259	225	649	318	272
232	209	217	238	165	433	236	198	600	287	253
40.1	38.2	40.6	37	38	40.7	37.2	38.4	42	37	42.6
31	31.3	30.8	31.3	29.4	35.2	36.2	30.1	40.5	31.9	40
31.2	30.7	30.6	30.9	30.3	35.5	31	30.5	39.4	32.1	31.9
32.2	30.7	31.1	31.1	29.9	35.3	31.7	31.2	39.7	32.9	32.4
31.3	30.9	31	30.6	29.7	35.8	31	30.6	39.4	32.2	32
48.5	41.5	69.4	85.2	39.7	71.8	642.5	52.2	88.1	80.1	53.9
271.6	321.7	303.8	309.3	270.8	298.5	356.3	278	260	373.1	227.8
237.3	199.9	239.3	232.7	205.8	215.6	238	202.8	280	310	198.3
17	23	17	32	18	15	78	18	6	36	6
11	0	3	15	2	0	75	1	7	22	1

SPECIFICATIONS : Internet service providers

ISP	Phone	Web site	Maximum connect speed (Kbps)	Points of presence	User-to-modem ratio	Network links	Most popular pricing plan
Access One	1800 818 391	http://www.aone.com.au	33.6	42, plus global roaming in 150 countries	10:1	6Mbits to Telstra Internet, 4Mbits to UUNet, 8Mbits to internetMCI, 4Mbits to Connect, own national backbone	$25 set-up fee, $39/month for 20 hours, or $5/hour flat rate
CompuServe	1300 555 520	http://www.compuserve.com.au	56 (x2)	10, plus global roaming	Undisclosed	CompuServe backbone	No set-up fee, $14.50/month for 2 hours then $5/hour thereafter
DIALix	1902 292 004 ($1 per minute)	http://www.dialix.com.au	33.6	9	10:1	Telstra Internet	No set-up fee, $40/month for unlimited access
Enternet	1800 818 262	http://www.enternet.com.au	56 (K56Flex)	20, plus global roaming in 52 countries	Undisclosed	204Mbits to Telstra Internet, 2Mbits to UUNet, 4Mbits to Access One	$25 set-up fee then $4/hour peak and $2.50/hour off-peak
Geko	(02) 9439 1999	http://www.geko.net.au	56 (K56Flex)	6	10:1	Telstra Internet, AT&T, plus peers	$25 set-up fee, then $40/month for 240 hours
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NOTE: Information has been supplied by ISPs and is subject to change. Contact ISPs for complete details.

Workshop

Welcome to Workshop, the section dedicated to bringing you all manner of tips, interesting information and do-it-yourself tutorials. Within these pages you will find useful shareware, informative operating-system-specific columns and easy-to-follow programming tutorials.

This month we're changing to a new competition structure for Bug of the Month that allows winners to choose from a selection of prizes. The first will be awarded in July, and as usual we'll award prizes for both interesting bugs and inventive solutions.

Also on the very near horizon is the much anticipated and frequently requested NT column. The new column will soon join Windows 95, OS/2, Mac OS and Linux in the Operating Systems section and will cover hints and tips, how-tos and walk-throughs for Windows NT 4.0 and beyond. If you have any specific topics you'd like to see covered in the NT column, drop us a line at the address on this page.

Be sure to check out Workshop online and let us know what you think. Send any comments, criticisms and ideas to workshop@acp.com.au.

Tech Talk 162

Technobabble delves into the terminology behind hard drives, while Step by Step explains the intricacies of overclocking.

Operating Systems 167

Windows 95 talks file types, OS/2 explores an alternative for Win-OS/2, Mac OS covers disk space and file systems, and Linux details the complex Linux boot process.

Programming 177

Developers Corner briefly covers the first steps of Windows programming, JavaScript lists the remaining methods and operators not already covered, and HyperText explains how to go about putting a home database on the Web.

Shareware Summary 183

All the files mentioned here can be found on this month's **apcmag.cd** in the Workshop section. If you have any Site of the Month recommendations, please send them to **workshop@acp.com.au** and you will be credited on the page.

Win! Win! Win!

Workshop is on the lookout for the most interesting, strange, funny, or downright weird software bugs you can find. These include code snippets, examples of features that function poorly, or procedures for crashing a particular application. Anything and everything that is buggy deserves mention.

Send us the bug of your choice via email to bugs@acp.com.au or snail mail, and you'll be in the running to win your choice of **development or application software** prizes from Workshop's limited software collection. The prizes change each month to ensure there's always something interesting for the avid bug hunters out there. Feel free to send screen captures or example code listings, as well as details of how to duplicate the bug, if applicable.

Winners will be announced in the July edition of *APC*, and the winning bug will appear in the Bug of the Month column. So start hunting!

Bug of the Month

This month's bug comes from Kim Groves, who wrote in to report a bug in Sun's JDK 1.0.2. However, when I checked it out, I found that the bug is in Kim's code, not the Java Compiler.

The code contained the statement: `index=(++index)*2`. First glance would suggest that this should be equivalent to `index=(index+1)*2`, but Kim's program was evaluating it as `index=index*2`.

Why is it so?

Java, like C and C++, divides a program up using what are known as sequence points. Space doesn't permit a proper discussion of sequence points here; but in a nutshell, you are not permitted to modify a variable more than once without an intervening sequence point. An '=' is not a sequence point. The above code is illegal, and it is completely undefined what a compiler will do with it. I tested it on a couple of compilers, and it produced the results that Kim expected. However, that's pure good luck, and we can't blame Sun's compiler for producing a different result. Bottom line: illegal code is unreliable.

As this is the IT industry, we reward mistakes as freely as success. So Kim will be rewarded with a copy of **Microsoft's Visual Studio** with which to practise. Who said that life was unfair?

Michael Smith

Get involved

All files mentioned in Workshop can be found on **apcmag.cd** or downloaded from our Web site at http://www.apcmag.com. Here you will also find a number of online discussion forums where you can discuss technical issues or just voice your opinion on any related topic.

Don't forget that Workshop is a reader-input section. Feel free to contact us by sending any ideas, comments or criticisms you have. You can email us at workshop@acp.com.au, or send snail mail to *APC* Workshop, PO Box 37, Sydney NSW 1028.

Ashton Mills, Workshop editor

The low-down on hard disks and hard disk advertising. **By Nathan Taylor**

Technobabble

Hard disks (Part 1)

It's hard to believe, but once upon a time we went without them. For years we were loading programs onto our computers directly from floppy disks and cartridges. But then came the Apple Macintosh and the IBM PC, and since then the hard disk has become an absolutely essential part of the computer system.

Perhaps more than any other technology in the PC, hard disk technology has progressed in leaps and bounds since it was first introduced by IBM 40 years ago. Put up your hand if you can remember when 20M was more that you could ever need for data storage — it wasn't that long ago. Now 2G (2,048M) is a bare minimum, and a lot of computers are selling with 6G or even 8G drives installed. At the top end, single hard drives are as large as 47G. The price per megabyte has dropped by an equally astonishing order of magnitude. Performance hasn't increased as dramatically, although it is many times better than it was.

So how do they work, and what's driving this dramatic increase of the capabilities of the hard disk? The answer lies in some astonishing feats of engineering, as amazing, if not more amazing, than the processors that drive the computers the hard disks go into.

The physical hardware

Essentially, a hard disk consists of a spindle-mounted data storing medium (the platter), over which hovers the read and write heads. The circular platter spins at a constant velocity, and the head moves up and down over the radius of the platter, and reads or writes the data on the platter when the correct part of the platter is brought underneath it by the rotation of the disk.

We'll be going into a discussion of how hard drives work in a bit more depth next month, but for now we are going to talk about the various vectors by which hard drives are measured, and how people are constantly being duped by advertisements for hard drives. It's worth a read if you've ever looked at one of those hard drive ads and wondered what all the figures mean, and whether one drive is better than another you've seen advertised.

Hard drive statistics

• Capacity

Where at one stage disk capacities were measured in megabytes, capacities are usually now measured in gigabytes, with some of the largest commodity hard disk drives approaching 50G. A typical PC has a hard disk with a capacity between 1G and 6G. New technology will continue to drive up the density of data on the platter, but terabyte-level storage is still quite a few years away, if it can be reached at all with the venerable hard disk technology.

One of the most confusing aspects of understanding hard disk capacity and speed is the way in which kilobytes, megabytes and gigabytes are measured. Generally speaking, there are two ways in which these data sizes are commonly measured: the binary system, which states values as an exponent of 2, or the decimal system, in which the sizes are powers of 10. In the binary system, for instance, a kilobyte equals 2^{10}, or 1,024, bytes. In the decimal system, a kilobyte is 1,000 bytes, slightly smaller than a binary kilobyte. Sure, this is not a lot, but the gap grows larger as bigger values are used: a binary gigabyte (1,073,741,824 bytes) is 7.4% larger than a decimal gigabyte (1,000, 000,000 bytes), which is fairly significant. (Memory is usually measured using binary notation, while networking links use varying notations, but most often decimal, so a 28.8Kbps modem operates at 28,800bps, not 29,491bps.)

This has confused a lot of people, since hard disk manufacturers generally quote disk capacity in decimal gigabytes to make their products look better. However, the computer usually interprets capacity using binary measurements, meaning that the size that the manufacturer has quoted and the size recognised by their computers is a little different. It also causes some confusion when it comes to the whole 2G partition size issue. A drive listed by its manufacturer as having a capacity of 2.1G drive actually appears as a 2G drive to the computer, so you don't need to worry about partitioning the drive.

• Performance

Just as they are with capacity, hard disk manufacturers are constantly trying to confuse us with their performance claims, deliberately using figures designed to mislead the uninitiated.

The most blatant of these is the use of seek times, latency and access times. No, they don't mean the same thing, and you have to make sure that you're comparing apples with apples when looking at the specifications of two different drives.

The seek time refers to the time it takes to move the head of the drive over the point on the platter at which the data is to be found. With ever lighter heads, the speed at which they can be moved has been increased in recent years, reducing seek times. The other issue to take into account is the distance the head has to move — if the head has to move from the outer ring to the inner ring, then it's going to take longer than if it had to move only a millimetre or two. That's why seek times are listed as 'averages' rather than absolute values. Seek times are usually measured in milliseconds.

But seek times are only part of the story — the platter is constantly rotating, and there's no guarantee that the segment of the disk which has the desired data on it will be under the head at that moment in time. So the head has to wait for the data to swing around and come under the head to be read. This is referred to as the latency, and is directly dependant on the speed at which the platter rotates. In currently available drives, this can vary from 3,600 rotations per minute (rpm) to 10,000rpm. Most consumer drives fall around the

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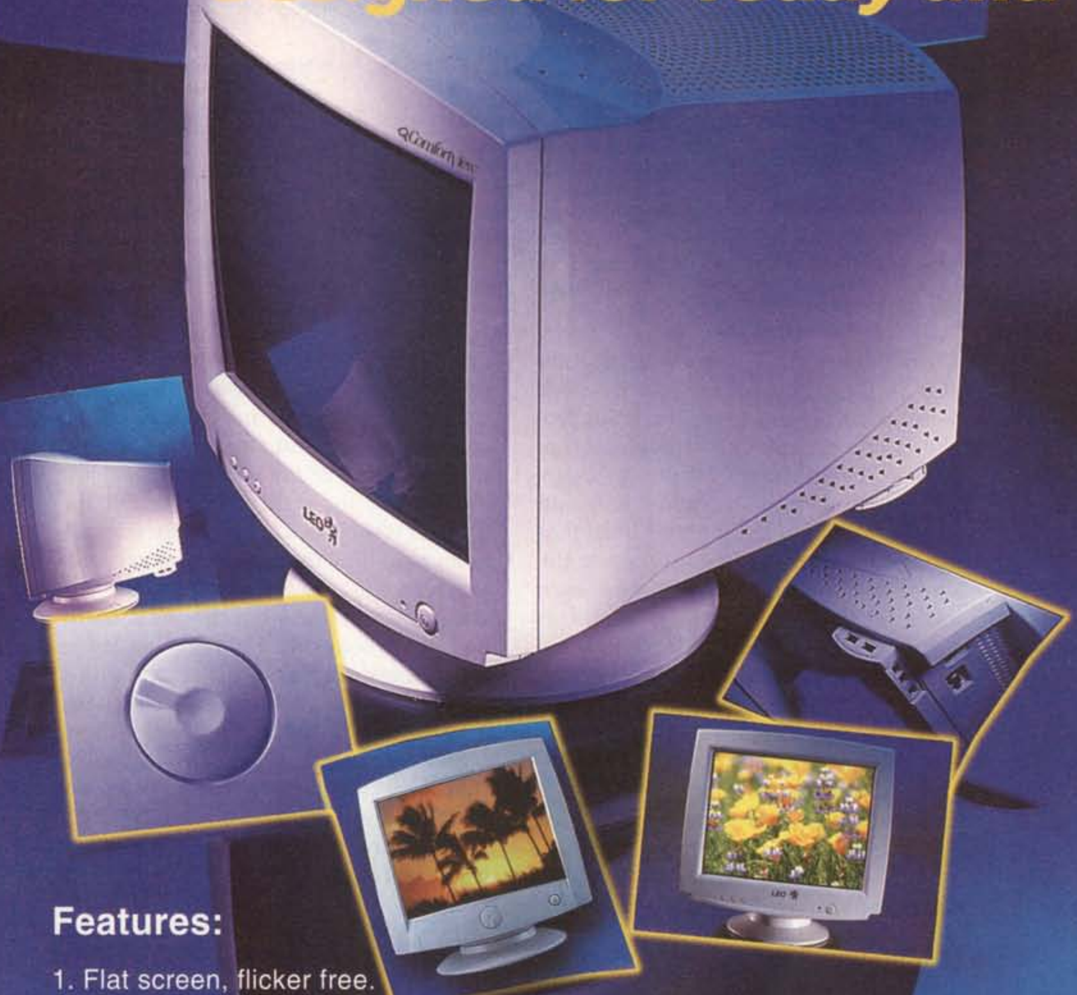

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4,500 to 5,400rpm mark. Again, the time (in milliseconds) is listed as an average, because the data may be just about to arrive at the same time the head does, or might have passed just before the head arrived at the right track, meaning that the drive has to wait for a whole revolution before it can access the data. The average latency is equal to half the time it takes to perform a full rotation of the platter: 8.3ms for 3,600rpm drives, 6.7 at 4,500rpm, 5.6 at 5,600rpm, 4.17 at 7,200rpm and 2.99ms for 10,000rpm drives.

Access times are simply the total of both the delays, so access time = seek time + latency. This is, of course, the most valuable figure for the buyer, but it is quite common for manufacturers to list seek times in lieu of access times in the hope of tricking buyers into thinking that their drives are faster.

The other important performance vector is the transfer rate. Most hard drives will be listed by the bus interface that they use, not by their actual transfer rates. An EIDE drive will have a rated speed of 16.6M per second, for instance, and an Ultra DMA drive will have a transfer rate listed as 33M per second (we'll cover what EIDE and Ultra DMA mean next month). This is the *theoretical* speed that the drive can deliver data, and generally does not come close to reality. You'd be lucky to get a sustained transfer rate of 6M per second on most drives. Few people selling hard drives will tell you the *real* transfer rate of the drive, so you've got to be careful when purchasing a drive, and remember that two drives using the same type of bus may not have the same performance levels.

The transfer rate depends on a number of factors, including the type of bus it uses, the rotational speed of the platter, the density of the data on the disk and the error correction and data reading techniques in use.

Another thing to be wary of is sustained transfer rates versus real transfer rates. In the real world, things like large file transfers constitute only a small proportion of a hard drive's activity. Most of the time, the hard drive is called on to perform a series of small reads and writes all over the surface of the platter. Given that the head has to continually seek the desired data, real transfer rates are even slower than sustained transfer rates. Our benchmarks give an indication of the kind of performance hit this makes, because it simulates the small reads and writes that hard drives are normally called on to perform. Taking this into account, an average hard disk frequently operates at about 800K per second to 2M per second in a test like Ziff-Davis' Business Disk WinMark.

Summary of drive performance vectors

Capacity	A decimal measurement of how much data the disk can hold. The capacity determined by the computer may be slightly less than that on the box of the hard disk.
Interface	The kind of bus used to connect the hard drive to the rest of the computer. It determines the theoretical maximum at which the hard drive can deliver data, although it is rare for a hard drive to come anywhere near this figure.
Seek time	The average amount of time it takes to move the head over the appropriate part of the disk platter. Not to be confused with access time.
Latency	The average amount of time it takes for the platter to rotate to bring the data under the head. Determined by the rotational speed of the platter.
Access time	The average time at takes to find a piece of data on the hard disk. It equals seek time plus latency.
MTBF	Mean time between failures. The average amount of time it takes for the hard disk to die. Should be treated with caution.
RPM	Rotations per minute. The speed at which the hard disk platter rotates. Has an effect on transfer rates and latency.

Reliability

The reliability of hard drives has been vastly improved since they were first introduced, despite increasingly delicate and complex drive and head mechanisms. But once again, drive vendors use dubious figures to convince buyers that their products are more reliable than those of their competitors.

It's called the mean time between failure (MTBF) rating, and if you paid any attention to it at all, you would believe that your drive was never going to go down. There is no standard way of coming up with an MTBF figure (vendors can just make them up if they choose), but the number is supposed to refer to the average amount of time the drive can be in operation before it dies.

It is patently obvious that most MTBF figures are bogus. One hard drive vendor, for instance, rates many of its drives with a 1 million hours MTBF. If this were the case, then the average time between crashes would be about 114 years. If you believe that one, I've got a bridge to sell you.

The reality is that it is next to impossible to tell how reliable a drive is going to be before you buy it without adequate testing. Because of the delicacy of the hardware, some drives may only last a short time, particularly if they're poorly treated. Others may perform happily for years without crashing once. The only lesson to be learnt is to back up your critical data constantly, or be prepared to lose it at any moment.

Next month well get down to the nitty-gritty of how a hard disk works.■

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An introduction to overclocking — getting more speed for free. **By Daniel Rutter**

Step by Step

You have, say, a 166MHz Pentium. What would you expect to pay to upgrade it to 200MHz?

How about . . . nothing?

Welcome to the wonderful world of overclocking — running chips faster than they're meant to go. The practice has been around roughly as long as CPUs as we know them, and with the advent of multi-frequency motherboards — which can accept processors of different speeds — it's become easy for anyone to play with.

The risks

While the idea of overclocking summons up visions of smoking CPUs and imposing repair bills, hardware damage is actually very uncommon. CPUs *can* be damaged by clocking them too high, but they almost always stop working long before that happens — they're specifically designed that way. Clock the chip back down again and all will be well.

Pretty much any overclocking operation will void your processor warranty. But since a chip that's been overclocked doesn't have a little flag announcing the fact, this is a difficult rule for the manufacturers to enforce if their customers choose to be economical with the truth.

The chief problem with overclocked systems is loss of reliability. Push a system too far and it won't work; push it a little less far and it'll just crash more often. Many overclocked machines work flawlessly. This column aims to show you how to make yours one of them.

How it works

Current IBM-compatible machines set their speed as a product of two numbers, the clock speed and the bus speed. The bus speed is the speed at which everything in the computer but the CPU runs, and it's slower than the advertised CPU clock speed. A common 200MHz computer, for example, has a bus speed of 66MHz (actually 66 and two thirds, but that's awkward to type), while the CPU runs internally at a '3x' multiple of this speed: 200MHz.

Sixty-six megahertz is the highest specified bus speed for all but the newest processors. Older models run at a 50 or 60MHz bus speed, or sometimes 55MHz. Many current motherboards, however, support the faster 75 and 83MHz bus speeds, at multipliers of up to 3.5. The very latest models support 100MHz bus speed and multipliers up to 4.5. Overclocking involves using higher bus speed and multiplier settings than your processor is meant to support.

You get a greater overall performance boost by increasing the system bus speed than by going for the highest possible processor clock rate, because the processor has to talk to the rest of the machine to get anything useful done. A chip set to 2.5 by 66MHz is clocked higher than one set to 2 by 75MHz, but the computer will run faster overall with the second setup.

83MHz is still largely for the lunatic fringe — you need good RAM and top-grade peripherals — but 75MHz works well on many systems.

On most motherboards, you select CPU type and speed by means of 'jumpers', little plastic blocks with a copper link inside that slide onto pairs of pins on the board. Some boards let you set up the CPU from the BIOS menu (accessed by hitting Delete after resetting), so you can twiddle without removing the case. In any case, it's not rocket science, and should be well documented in the motherboard manual.

If you have a software set-up motherboard — if you set the CPU speed in the BIOS set-up screen — you can paint yourself into a corner if you overclock too far. If the machine is over-overclocked and unable to make it back to the BIOS set-up screen, you'll have to reset your CMOS and set the machine up again, telling it about its hard drive, and so on.

The PCI bus, into which most expansion cards plug, always runs at half the system bus speed — 33MHz in a 66MHz bus machine. Using higher bus speeds can cause problems, because some PCI cards refuse to work, or overheat, at more than 33MHz. The usual suspects are cheap SCSI or network adapters. Problems can also arise with EIDE hard and CD-ROM drives; the motherboard EIDE interface or the hard drives themselves may not be happy at higher bus speeds.

Windows 95, for all its failings, is a great tester for overclocked systems. If your system is a borderline case, Windows usually won't start. If Windows does start, it's time to do some demanding but non-critical computing (playing games is an excellent idea) to see if the machine runs consistently.

Pick your processor

Intel Pentiums are the most overclockable CPUs, thanks to Intel's weighting of reliability over performance. The AMD K6 comes second, with the Cyrix/IBM 6x86 a distant third, thanks to that chip's already strained specifications. There are persistent rumours about Pentiums and Pentium IIs which deliberately have support for higher than rated multipliers disabled. If you've got such a chip, you can still pump up the bus speed, but that's all.

The cheaper AMD K6 has two problems. The first is that it's easy to remove the markings from the top of the chip and reprint it with a more impressive rating. Doing the same thing with Intel processors requires fancy machining, but the K6 is dead easy to fake. So beware of suspiciously cheap K6 processors; you may be buying an already overclocked component. If your K6-233 can't even manage 266MHz operation, it may be a reprinted 200 or worse.

The second problem with the K6 is that it's naturally clocked closer to its limit than the Pentium. K6 processors run hotter, and so they're more likely to need better cooling if you decide to overclock them. Essentially, compared to Pentiums, K6 processors are already somewhat overclocked. But they *are* cheaper.

The even cheaper Cyrix/IBM 6x86MX is more difficult again to overclock, because it's already running very close to its thermal limit. If the K6 is a bit overclocked as designed, the 6x86 is already pushed about as far as it can go. You're unlikely to have success overclocking these chips, and attempts to do so have been known to result in dead chips.

You can overclock Pentium Pro CPUs, too. The Pentium Pro's design gives smaller improvements from increased bus speed, and Socket 8 (Pentium Pro-compatible) motherboards never seem to support 75 or 83MHz bus speeds. If you have a Pentium Pro 150 or 180 (running at 3x50MHz and 3x60MHz respectively), bumping the bus speed up to 66MHz is a popular and reliable option.

RAM reliability

Higher bus speeds require high-quality RAM. Rabid 100MHz bus speed overclockers have to use SDRAM, which often means a new motherboard, since older boards don't support it. Any old SIMM RAM should do for 66MHz, and 75MHz usually doesn't cause RAM problems either — 60ns EDO SIMMs are fine. You need brand-name EDO SIMMs for reliable 83MHz operation. If you're building a new system, SDRAM is the way to go, since it's not much more expensive than SIMMs and gives a slight speed improvement all by itself.

Brand-name boards

Motherboard quality is also important for successful overclocking. No-name 'yum cha' motherboards may have a jumper to set 75 or 83MHz bus speed, but there's no guarantee that they'll work reliably, or at all, at these speeds. Naturally, the board should have support for the CPU you intend to use. Ideally, it should also be possible to set the CPU supply voltages in 0.1V steps.

Recent processors have separate voltages for the CPU core and the I/O section of the processor — core voltage for the Pentium MMX, for instance, is 2.8V, and the I/O voltage is 3.3V. Increasing these settings can enhance processor stability, but also exponentially increases the heat the processor produces.

Bus speeds and multipliers

		Bus speed						
		50	**55**	**60**	**66.66667**	**75**	**83**	**100**
Multiplier	**1.5**	75	82.5	90	100	112.5	124.5	150
	2	100	110	120	133.3333	150	166	200
	2.5	125	137.5	150	166.6667	187.5	207.5	250
	3	150	165	180	200	225	249	300
	3.5	175	192.5	210	233.3333	262.5	290.5	350
	4	200	220	240	266.6667	300	332	400

This table shows every possible multiplier setting. No processor supports all of these multipliers.

Keeping your cool

When a processor overheats, its operation slows down, and some sections slow down more than others. When this problem becomes bad enough that sections of the processor that are supposed to be synchronised with each other get out of phase, it results in crashes, resets, hangs and other unpredictable errors. The classic symptom of an undercooled processor is a machine that runs fine for only about 10 minutes.

The rated temperature range for the garden variety PC CPU is something like 20 to 80°C. This is the temperature of the chip, not the temperature of the case in which it's packaged; a case that reads 50°C on its top surface may well contain an 80°C chip on the verge of thermal shutdown. Chips can survive, but not function, at temperatures of 125°C or more.

Since processors are rated to run at their specified speed in a worst-case scenario (in other words, with really abysmal cooling), many mildly overclocked processors are perfectly happy without any more cooling than they had at stock speed. More aggressive overclocking, though, requires sterner measures.

Modern Socket 7 and Socket 8 (Pentium-class and Pentium Pro) processors are kept cool by a heat sink, a lump of finned aluminium that clamps to the chip, with a little fan on top. In between the heat sink and the processor is either a square of highly heat-conductive material or a smear of heat sink grease. The Pentium II has its heat sink built into its hefty processor cartridge, and you can't change it. Some Pentiums come with a heat sink and fan permanently bonded to the chip by Intel.

An ordinary heat sink and fan combo can only cool the processor to the temperature of the air around the heat sink. So if the limiting factor in your machine is the internal air temperature, the biggest heat sink and fan in the world won't cool the processor any more.

If your PC lives in a 'minitower' case, it probably has poor cooling. Minitowers are small and light and neat, but their cramped design gives them lousy ventilation. A computer in a full tower case will, all things being equal, run cooler. These cases generally have mounting points for a second sucking fan on the front panel. You can also buy 'slot fans' that exhaust more air through unused expansion card gaps at the back.

If all that isn't enough, get yourself a 'Peltier effect' CPU cooler, which uses a solid-state heat pump as well as a regular heat sink and fan, giving the CPU its own little no-moving-parts refrigerator. With a Peltier cooler, your CPU can be cooler than the air inside the case. But at around $100 for a Peltier cooler, you have to weigh up how much overclocking bang you're going to get for your buck.■

Overclocking 3D

The CPU isn't the only chip in your machine you can overclock. If you have a 3DFX Voodoo-based 3D card you can overclock the 3D processor to achieve higher frames per second — without going near a screwdriver or jumpers.

All 3DFX Voodoo processors read system environment variables every time they initialise to allow the knowledgeable user to change or tweak the card's performance easily and quickly. The following environment variables allow you to improve the performance of your Voodoo-based card by overclocking the processor and enabling performance features:

SST_GRXCLK Sets the speed of the processor. Most cards default to values between 50 and 55, although 57 is reported to be a stable maximum. Be careful going past this value as you may damage your card.

SST_FASTMEM A setting of '1' enables fast memory reads.

SST_GAMMA Sets the gamma of the card; values between 0 and 1.95

SST_PCIRD A setting of '1' enables fast PCI reads.

SST_SWAP_EN_WAIT_ON_VSYNC A setting of '1' stops the card synchronising to the monitor's vertical refresh rate. The result is faster performance, although image 'tearing' may occur.

SST_SCREENREFRESH Sets the refresh rate of the card. Standard screen refresh rates are 60, 75, 85, 100 and 120Hz. Take note your monitor must be able to support the refresh rate and higher refresh rates tax the card, equating to slower frames per second.

All of these can be typed at the DOS prompt or enabled every bootup by adding them to your AUTOEXEC.BAT. The format is set: [environment variable]=[value].

Windows 95

The files that lie behind Windows 95.

By Kieran McNamee

There are many files that are needed to make Windows 95 work, yet most of us don't know what their functions are. It is not necessary to know what every file does, but it's good to have some knowledge of the more common ones.

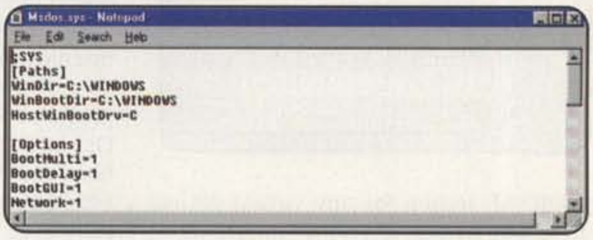
This month we take a look at some of the files within Windows 95 and give a brief explanation of their role in making your computer work. A lot of these files are crucial to Windows 95, so they are hidden to prevent users from accidentally deleting them.

Boot-up files

IO.SYS (C:\) This is one of the more important files. It contains the instructions that make up the command line operating system. It is commonly confused with the COMMAND.COM file, which is actually the DOS shell. Although DOS is not used, often it is still needed for Windows 95 to load. During the process of booting, the IO.SYS file calls and loads a number of files; these include the HIMEM.SYS file and the WIN.COM file (which loads Windows 95).

HIMEM.SYS (C:\windows) HIMEM.SYS is a real-mode driver that takes up about 1K of conventional memory. It allows Windows 95 programs to use extended memory, which provides more efficient management of your system's memory. Windows 95 won't start without HIMEM.SYS loaded.

MSDOS.SYS (C:\) A configuration file read by IO.SYS, the MSDOS.SYS file can be used to determine which mode to start in. Options to start in DOS or Windows 95, which version of DOS, and whether the Windows start-up screen should be used are all defined with a number of commands. There is no need to go into great detail over the commands, but they include 'bootmulti', 'bootgui' and 'bootwin', and the value of each command can be either one or zero. DOS users will remember that MSDOS.SYS used to be binary in nature and was a core part of MS-DOS. Don't be fooled; the DOS MSDOS.SYS bears no relation to the Windows 95 version.



```
;SYS
[Paths]
WinDir=C:\WINDOWS
WinBootDir=C:\WINDOWS
HostWinBootDrv=C

[Options]
BootMulti=1
BootDelay=1
BootGUI=1
Network=1
```

AUTOEXEC.BAT and **CONFIG.SYS** (C:\) The functionality of both of these files was reduced when many of the Windows 95 boot-up options were incorporated into the Registry. If you have a look at the AUTOEXEC.BAT and CONFIG.SYS files of most Windows 95 machines you will likely find that they are both empty. For hardware that's not supported by 32-bit drivers, the CONFIG.SYS file may need to be edited to load the required real-mode drivers.

WIN.COM (C:\windows) This is the file that starts Windows. If Windows 95 did not have to be backward compatible with 3.x programs, IO.SYS could bypass WIN.COM and load VMM32.VXD (which switches the processor to operate in protected mode).

Registry files

The Registry simplifies the operating system by almost eliminating the need for AUTOEXEC.BAT, CONFIG.SYS and INI files. There are two files that hold the Registry data: SYSTEM.DAT and USER.DAT.

The USER.DAT file holds all the Registry information regarding a user's preferences for the desktop. If there is more than one user on a computer, there can be multiple USER.DAT files in different folders. The SYSTEM.DAT file holds all the hardware and software settings for the computer.

Note that these files can grow fairly large. It is not uncommon to see a SYSTEM.DAT file reaching 10M or even breaking the 20M barrier. This is because when you uninstall a program, it doesn't remove its settings from the Registry. It simply disables the details instead of deleting them.

For more information on using the Windows Registry, see the earlier Workshop columns on the subject (*APC* January, page 105, and September 1997, page 163).

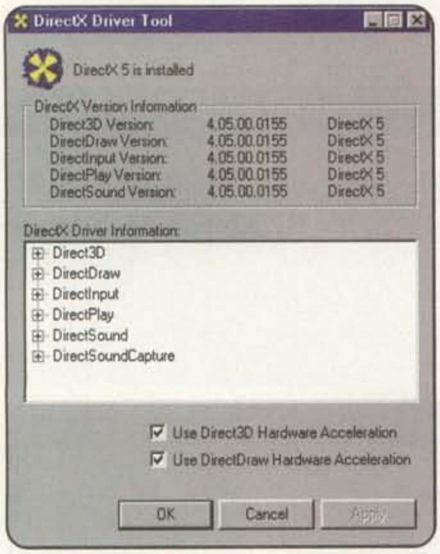
System configuration files

More commonly used when we were all using Windows 3.x, the 'sysedit' utility still has some use. It is Microsoft's intention that programs no longer use these types of configuration files, and that all settings will eventually be held in the Registry. However, some of the system configuration files have needed to remain in Windows 95 so that Windows 3.x programs can still be used. The files that are opened with sysedit include SYSTEM.INI, WIN.INI, PROTOCOL.INI, as well as the CONFIG.SYS and AUTOEXEC .BAT files. INI files contain one or more sections with 'entries' containing keynames and values. The general format is:

```
[section]
keyname=value
```

The system files outlined below can be opened and edited by running sysedit from the Start menu's Run option.

SYSTEM.INI (C:\windows) Stores system-specific information concerning the hardware and device driver configuration of the system. Windows 95 checks the



DirectX 5 is installed

DirectX Version Information

Direct3D Version:	4.05.00.0155	DirectX 5
DirectDraw Version:	4.05.00.0155	DirectX 5
DirectInput Version:	4.05.00.0155	DirectX 5
DirectPlay Version:	4.05.00.0155	DirectX 5
DirectSound Version:	4.05.00.0155	DirectX 5

DirectX Driver Information:

- Direct3D
- DirectDraw
- DirectInput
- DirectPlay
- DirectSound
- DirectSoundCapture

☑ Use Direct3D Hardware Acceleration

☑ Use DirectDraw Hardware Acceleration

'[386Enh]' section for any virtual device drivers as well as any other information that hasn't migrated to the Registry.

WIN.INI (C:\windows) Stores information about the appearance of the Windows environment.

PROTOCOL.INI (C:\windows) Stores information regarding network settings.

The Windows install files

You probably forgot about these files a long time ago, but there's a good chance that even after installation of Windows 95, the same set-up files will be accessed again and again. The 'cabinet' files, with a CAB extension, along with the INF files that can be found in the C:\windows\inf directory (which is hidden by default), hold all the data that eventually makes up Windows 95. Adding or reinstalling Windows 95 components normally requires you to find that Windows 95 CD once again. Copying the contents of the Windows 95 CD to the hard drive is a good option if you have enough space. Then all you have to do is change the setting in the Registry so that Windows will know that the CD is no longer needed when updates are made (see *APC* January, page 105).

Extracting files from the 28 CAB files is done automatically by Windows Setup; they can also be extracted manually using the EXTRACT.EXE program. To get a list of the contents of a CAB file you can extract the details to a text file through the DOS command line: `extract /d win95_02.cab > List95.txt`, 'win95_02.cab' being the cabinet file location from which you are extracting.

An INF file is organised in several sections which define information that is used to determine the resource needs of hardware devices and to install software. Common information in most of these files includes the manufacturer and version number of the software or hardware. Users can open these files and read the instructions that will be processed during the software or hardware setup.

DLL files

DLL files are cluttering up windows\system directories on all Windows 95 machines. Short for dynamic link library, this type of file is used by almost all Windows programs.

Many DLL files would have been installed onto your computer when Windows 95 was installed, and since then many programs would have installed their own DLL files. These libraries of executable functions and data do not need to be compiled with the program that is using it. Programs can create static (remains constant during program execution) or dynamic (called as needed) links to these DLL files. Following are some of the more common DLLs.

VBRUN300.DLL (C:\windows\system) If you have any applications that were programmed using Visual Basic then you will more than likely have this file installed on your system. There have been Visual Basic Run files for each version of the programming language. The VBRUN300.DLL will be on most people's computers, as it takes care of all programs programmed using Version 3 or earlier of Visual Basic. Programs created with Visual Basic 4 or 5 will need updated Run files.

COMDLG32.DLL and **COMMDLG.DLL** (C:\windows\system) The common dialog box DLL file is made up of the File Open, Save As, Print, Find/Replace, Page Setup, and Text Properties boxes. All programs use this DLL so that there is consistency for these common tasks and it also means that each programming team does not have to design its own dialog boxes.

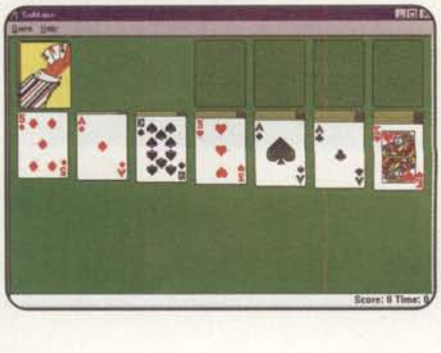
WINSOCK.DLL and **WSOCK32.DLL** (C:\windows) Winsock is the program that handles input and output requests for Windows 95 Internet applications. It's called Winsock because it's an adaptation for Windows of the Berkeley Unix sockets interface. The socket interface is a method of exchanging data between two programs on the same computer or, in Windows 95's case, over a network. Under earlier versions of Windows, a Winsock program (such as Trumpet Winsock) had to be installed before connection with the Internet was possible. The Winsock file sits between the Internet program you are using (a Web browser, for example) and the network, acting as an interface between Windows and TCP/IP (Transmission Control Protocol/Internet Protocol). In short, your Internet applications tell WINSOCK.DLL what to do, WINSOCK.DLL translates these commands to your TCP/IP stack, and your TCP/IP stack passes them on to the Internet.

DirectX DLLs (C:\windows\system) If you have installed any of the latest games on your machine, then you will have also installed the DirectX library of files. This collection of APIs (application program interfaces) from Microsoft improves game performance by allowing programmers to write programs that access hardware features of a computer without knowing exactly what hardware will be installed on the machine where the program is eventually run. The main DirectX files are DDRAW.DLL, DINPUT.DLL, DSOUND.DLL and DPLAY.DLL (I'll leave it to you to work out what the 'd' in front of each file stands for). We are currently up to Version 5 of DirectX, and DirectX 6 is coming soon.

The basic functions of the DirectX DLLs are:

- DirectDraw, a memory manager for video memory;
- DirectInput, which allows fast access to analog and digital joysticks;
- DirectPlay, which improves network games by providing a way for games to communicate with each other that is independent of the underlying network service;
- DirectSound, which provides direct access to the computer's sound device; and
- Direct3D, delivering fast software-based rendering as well as assisting with hardware acceleration for 3D graphics.

CARDS.DLL (C:\windows\system) Have you ever wondered why the deck faces of cards in games such as Freecell, Hearts and Solitaire look exactly the same? The reason is because the card faces all come from the CARDS.DLL file. This may not be a crucial Windows 95 file, but isn't it good to know why all the cards look alike?■



So you're sick and tired of waiting for a native OS/2 version of that essential Windows application? What are you waiting for? Convert it yourself! **By Ashton Mills**

OS/2 Warp

Normally I try to cover specific aspects of OS/2 that involve the use and configuration of the operating system, or the many ways an avid user can tweak and optimise their system. However, this month's topic is something quite different, but nonetheless fascinating. It could well be the most important development for OS/2 this year, and it isn't even an IBM initiative.

Time for a change

I must admit that I had been losing some faith in OS/2 of late. OS/2 developers seem to be dropping like flies, but like 'Star Trek' groupies, some of us just won't give up hope in the utopian OS that is OS/2. So much so, in fact, that new developments are appearing while others die off.

There's always the hot topic of 'Warp 5' and what it will contain, and even rumours of a 'Warp 6' which, any OS/2 user has to admit, initially seems unlikely. Despite OS/2 being popular among corporations as a stable and efficient server platform, its client fan base is still dim- inishing. Eventually the demand for a client version at all may be questionable, but I digress.

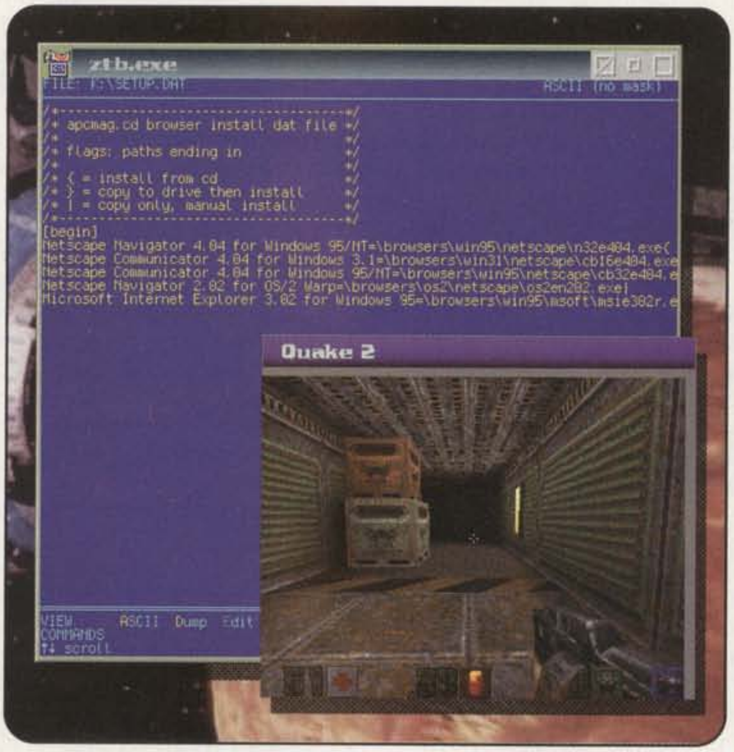
Hope is renewed when one comes across OS/2 developments that don't just promise new functionality, but also promise that OS/2 can continue to go somewhere instead of falling by the wayside.

Take the Win32-OS/2 project. Finding OS/2's seamless Windows 3.x emulation of little use these days? Don't want to use Windows 95 because it's little more than a hyped-up front end for DOS? Win32-OS/2 may be the answer for all of us.

The what

The Win32-OS/2 project team is developing a converter to transform Win32 (that is, Windows 95 and Windows NT) applications to *native* OS/2 applications. Sound like a bit of a dream? It's certainly a lot of hard work, but it's eminently viable.

Some of you may remember hearing the term 'Open32' when *APC* first reviewed OS/2 Warp 4, the purpose of which was to in ease the transition for Windows developers wishing to port an application to OS/2. Developers such as Lotus use Open32 to produce the OS/2 versions of their Windows software.



```
FILE: F:\SETUP.DAT                                    ASCII (no mask)
/*---------------------------------------*/
/* apcmag.cd browser install dat file */
/*                                     */
/* flags: paths ending in              */
/*                                     */
/* { = install from cd                 */
/* } = copy to drive then install      */
/* | = copy only, manual install       */
/*---------------------------------------*/
[begin]
Netscape Navigator 4.04 for Windows 95/NT=\browsers\win95\netscape\n32e404.exe{
Netscape Communicator 4.04 for Windows 3.1=\browsers\win31\netscape\cb16e404.exe
Netscape Communicator 4.04 for Windows 95/NT=\browsers\win95\netscape\cb32e404.e
Netscape Navigator 2.02 for OS/2 Warp=\browsers\os2\netscape\os2en202.exe|
Microsoft Internet Explorer 3.02 for Windows 95=\browsers\win95\msoft\msie302r.e
```

Open32 is essentially the Win32 API set implemented under OS/2. However Open32 only supports 750 of the 1,750 Win32 APIs, so much of the work being done by the Win32-OS/2 team is in writing new or modified OS/2 APIs to match the missing Win32 ones.

The aim of the Win32-OS/2 project is to be able to write a converter that will be able to convert any Win32 application to a native OS/2 one. Realistically, it's unlikely all applications will be able to be converted, but once the team finishes coding the currently missing main Win32 APIs for OS/2, it's possible that a very large number of applications will convert just fine.

More importantly, the Win32-OS/2 project is a collection of tools and DLLs for the *end user*. That is, any OS/2 user can use the tools to create native OS/2 versions of their commercial Windows software. No source code is required, as the Win32-OS/2 converter works directly on the EXE and DLL files.

The how

The converter itself is called PE2LX, otherwise known as the Portable Executable To Linear Executable converter. PE is Win32's EXEcutable and DLL format, while LX is OS/2's. The home page for the project (listed below) describes the structure of the two formats in depth and how the converter is able to translate between them.

In order to convert a Win32 application, it's necessary to convert both the EXE and any associated DLLs whose functions aren't already implemented by Open32. Converting the EXE can be done by the user using PE2LX, but if the programs require functions that aren't present in Open32, the missing functions must be ported to OS/2. This is where the team are doing their work now, filling in the gaps for the functions that Open32 doesn't cover. It's only early stages yet, but the team has managed to fill enough gaps to get a number of Win32 applications to be converted. As they continue to fill in these missing functions, more and more Win32 applications will be able to be ported.

Of important note is that 16-bit Windows applications cannot be converted — and as the Web page rightly states, why would they? That's what Win-OS/2 is for. Besides, Win32 applications constitute just about all Windows applications currently being produced, and those that are of use to you are likely to be Win32 applications.

Also, at the current stage of development, any programs compiled with a Borland compiler cannot be converted. It's something the team is working on and should have fixed in the near future (if not by the time you read this).

Converting a program is as simple as running the PE2LX converter on the EXE and adding the location of the supplied Win32-OS/2 project DLLs to your LIBPATH. The most common error you're likely to see is a report of your newly converted application failing to load a specific Windows DLL. If this happens, there's nothing you can do until the development team converts that DLL into an OS/2 version and supplies it in the distribution.

Does it really work?

Yes indeed. The Win32-OS/2 home page lists a number of basic applications that the team has so far successfully converted. These include Freecell, Notepad, Windows Calculator, Solitaire, MFC (Microsoft Foundation Class) samples and, more impressively, 3DFX's Glide library and Id software's Quake II. See the screenshot on the previous page to see a native OS/2 version of Quake II running in a window on my OS/2 desktop. The conversion process itself took no more than a few seconds — impressive, to say the least.

At this stage, however, the team realistically states that most applications are unlikely to work. This is due to the fact that they are still in the process of creating OS/2 APIs to match the Win32 ones. For example, most Win32 applications use the comctl32 DLL to create standard button controls, toolbars, image lists and so on. There is currently no equal for this in Open32 and so the development team must convert it in order for those Win32 applications that use it to work under OS/2. Once such a core DLL as this is converted, however, the number of applications that can be successfully converted will rise dramatically.

Between Open32 and what the team has so far written there is now support for Win32's OpenGL, Winsock, multimedia, OLE and even DirectDraw and DirectSound functions as well as enough of Win32's core DLLs such as gdi32 and kernel32. We're not just talking about being able to convert simple word processors here. With multimedia and rudimentary DirectDraw support it's possible to convert and use DirectX applications. According to the home page, the team has already been able to run a DirectX SDK example.

By now you must, like me, be at least a little excited. Despite OS/2's wonderful efficiency and stability the biggest problem is always trying to get around those few essential Windows applications you use for which there is so far no (or no good) OS/2 equivalent. The Win32-OS/2 project not only promises to change that, but does so from the end-user perspective with no other requirements than the original, installed, Windows program on your system.

Where's it at?

The development team consists of Tmur Tabi (RTMidi), Sander van Leeuwen (GUS OS/2 drivers) and Chris McKillop, among others. It's good to see such a gathering of well-known OS/2 developers who've spent years producing programs for the OS/2 community, and continue to do so in such an important project.

They welcome constructive feedback, but please read the Web page first before submitting a bug or asking any questions. The current PE2LX converter may well convert some of your applications as it is, but the larger or more complex ones probably won't be able to be converted for some time to come. The converter is in an early alpha stage and requires a fair amount of work before it will be able to convert an average Win32 application.

Also take note that the team is currently aiming to convert only those applications that are useful and for which there is no OS/2 equivalent, as there's little point spending time debugging the converter and coding new API functions to support rarely used applications. They do, however, appreciate any software donations of commercial applications which may help convert it, and others like it.

For once, this is something the entire OS/2 community can help with. Visit http://www.os2ss.com/win32-os2 and read all about it. Download the current version from the site or from this month's **apcmag.cd** and try it out. Also check out http://www.yoursite.co.uk/os/2 for a listing of applications that other users have so far tried and the measure of their success.

Without a doubt this is a development that could bode well for all OS/2 users, solving the problem of application support and at the same time providing access to the wealth of the Windows programs most of us have come to know so well.■

Tip of the Month

In this age of multi-OS systems it isn't uncommon to find one of your operating systems clashing with another. Apart from the odd conflict over which OS should hog the primary partition, most operating systems live well together.

However, conflicts arise when it comes to file systems and the attempt of one OS to implement a compatible version of the other's file system.

Enter Windows 95 and OS/2. For those of you who, like myself, use both operating systems (there are *no* real games for OS/2, though perhaps Win32-OS/2 will change that), it can be a real pain to find that OS/2 prefers to write files in the traditional FAT method while Windows 95 tries its best to emulate a real file system with VFAT.

Those of you who know what I'm talking about are already nodding with pained understanding. How many times have you rebooted to Windows only to find it trying to scan your drive and 'correct' long filename errors which just happen to be vital work files you wrote to your shared FAT drive from OS/2? And why is it that Windows 95's version of 'correct' is to flat out delete the files or the FAT entries pointing to them?

So far there have been only two solutions: don't write to a shared FAT drive and let Windows 95 corrupt them all (which makes it harder for you to swap information between operating systems); or set aside a FAT partition or directory that you swear never to scandisk, disk doctor or defragment — which just leads to eventual file corruption anyway.

On this month's **apcmag.cd** you'll find a program called VFAT_003.ZIP which is, essentially, the long-awaited fix for this problem — a VFAT IFS driver. OS/2's IFS (Installable File System) structure makes it easy for third parties to write new file systems at any time and simply plug them into OS/2. The VFAT IFS driver gives read and write access to VFAT drives, finally removing the problem caused when OS/2 writes to FAT drives in a manner that isn't compliant with Windows 95's VFAT.

If you're a Linux user, the VFAT IFS driver also includes the EXT2 IFS driver, allowing OS/2 to read and write Linux EXT2 partitions. What more could you want?

Why does a document containing a few hundred characters occupy several kilobytes of disk space? **By Stephen Withers**

Mac OS

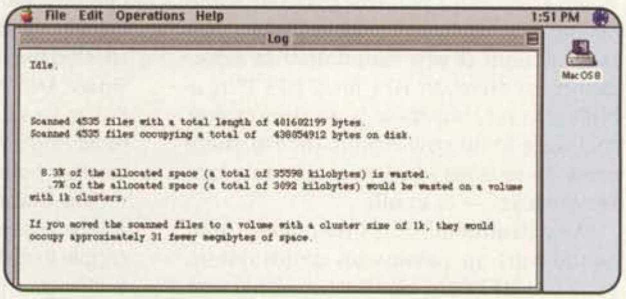
It's a perennial question. Why do Macintosh files occupy more disk space than their apparent size? Well, there are two reasons. The first applies to many operating systems, while the other is Mac-specific.

Disk space is allocated in blocks, which are typically larger than one sector. Allocating blocks rather than sectors improves performance, as the file system has to keep track of fewer units of space and fragmentation is reduced. The downside is that storage space is wasted.

Secondly, a typical Macintosh file consists of two 'forks' — one contains the data itself (the text, in the case of a SimpleText document), the other holds the file's resources (such as PICT images embedded in the document or custom icons).

A certain README file contains 1,693 characters of text plus a custom icon for a total of 3,419 bytes. Depending on where this file is stored, it occupies 4K, 6K, 13K or 17K of disk space. In each case, this is one block for the data fork and one for the resource fork. The block size varies because the volume sizes are different. Under HFS (Hierarchical File System, the file system used on the Macintosh for over a decade), a volume can be divided into no more than 65,536 blocks. That's fine for drives with capacities measured in megabytes — a 400M volume can have a block size of 6.5K (hence the 13K file size mentioned above), but by the time you reach 1G the block size has escalated to 16K, and at 2G it is 32K.

As the block size increases, so does the 'slack space', the unused bytes in the last block occupied by the file. In the example above, the slack varies from 677 bytes (effectively zero, since the slack in each fork is less than the sector size) to over 13K. Consequently, it is possible to copy all the files from a volume to one that's bigger without gaining any free space.



```
Idle.


Scanned 4535 files with a total length of 401602199 bytes.
Scanned 4535 files occupying a total of   438054912 bytes on disk.


  8.3% of the allocated space (a total of 35598 kilobytes) is wasted.
   .7% of the allocated space (a total of 3092 kilobytes) would be wasted on a volume
with 1k clusters.

If you moved the scanned files to a volume with a cluster size of 1k, they would
occupy approximately 31 fewer megabytes of space.
```

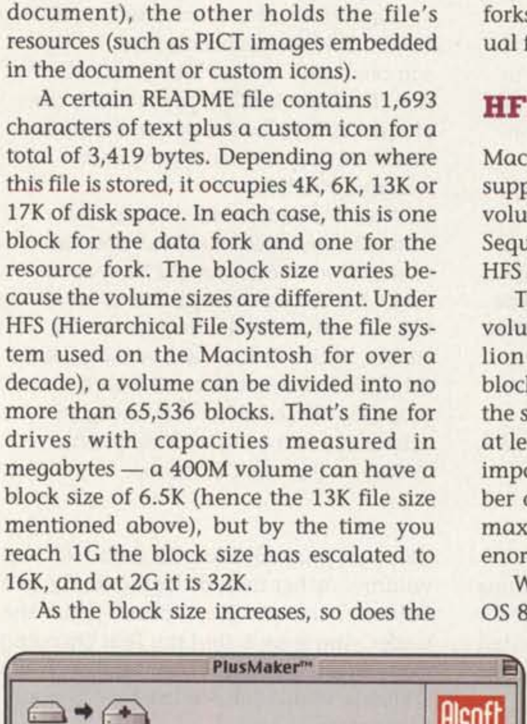
The number of blocks also limits the number of files that can be stored on a volume to "substantially fewer than 65,536", to use Apple's phrasing, since many files require blocks for the data and resource forks. Furthermore, the size of an individual file is limited to 2G by HFS.

HFS Plus

Mac OS 8.1, released in January, includes support for HFS Plus (or Mac OS Extended) volumes. The new file system, codenamed Sequoia, gets around the restrictions of HFS just outlined.

The maximum number of blocks per volume has been increased to over 4 billion (4,294,967,296), allowing smaller blocks on large volumes, which reduces the slack space. Each file must still occupy at least one block, of course, but HFS Plus imposes no other restriction on the number of files per volume. Furthermore, the maximum file size under HFS Plus is an enormous 2^{54} bytes.

When erasing a disk for HFS Plus, Mac OS 8.1 still varies block sizes according to the volume size: 0.5K is used from 32M to 256M inclusive; 1K over 256M and up to 512M; 2K over 512M and up to 1G; and 4K for any volume bigger than 1G. These sizes are not set in stone. Alsoft's PlusMaximiser utility enhances the Finder's Erase Disk command with the additional choice of 'Mac OS Maximised' (0.5K blocks regardless of volume size).



Please choose a disk to convert...

Disks: HDT 81 MB

- "HDT 81 MB" is ready to be converted.
- File storage will be 3 times more efficient.

CharisMac's Anubis Plus 3.0 and FWB's Hard Disk Toolkit 2.5 allow user-selected block sizes. This feature helps get the best performance and storage space out of a drive. A small block size is appropriate for volumes that will store mainly small files, such as letters and memos. The start-up volume is also a candidate, as many of the items in the System Folder are quite small and tend to include plenty of aliases. The largest block sizes will give the best performance with large, sequentially accessed files such as digital audio and video, certain complex graphics and so on, and the reduced fragmentation may also benefit large database files.

Miscellany

Several programs calculate the effect changing block size has on slack space. MacSlack (http://www.pobox.com/~ericb/software/macslack/) lets you set the block size of interest then drag and drop an item to get an estimate of the saving or penalty.

It isn't essential to erase your disk(s) in order to switch to HFS Plus. PlusMaker, another Alsoft product, lets you reformat a volume with all the files intact. Depending on the volume size and the speed of your system, this is probably a coffee break job. It worked well when I tested it on a couple of drives.

To determine a volume's format, the Finder's Get Info command reports Mac OS Standard or Mac OS Extended.

If you'd like to extend the slack-saving benefits of HFS Plus to your (large) RAM disk, simply erase it, selecting Mac OS Extended.

Performance comparisons between HFS and HFS Plus vary according to the benchmark used. My own testing showed virtually no overall difference, but others have reported distinct differences with specific applications.

There's more to Sequoia than the Mac OS Extended format. At a later stage, a new API will allow Mac OS programs to create files bigger than 2G, and eventually

Mac OS may be able to fully access Sequoia's 255-character Unicode file names.

Possible downsides

When Mac OS 8.1 was first released, some people were reluctant to install it because they thought it was mandatory to reformat hard drives to HFS Plus. HFS Plus is built into 8.1, but there is no compulsion to change to the new format. Indeed, there are a few reasons why you might not want to switch yet — or at all.

Any likelihood of a drive being used as the start-up volume on a 68k system rules out HFS Plus, but if you connect an HFS Plus disk to a pre-8.1 Mac, an HFS 'wrapper' volume will mount with a note that explains what's happening. This is particularly important for removable media, as it reduces the risk of the disk being erased by mistake. This wrapper is provided by Mac OS 8.1, but it may be omitted by future and third-party formatters.

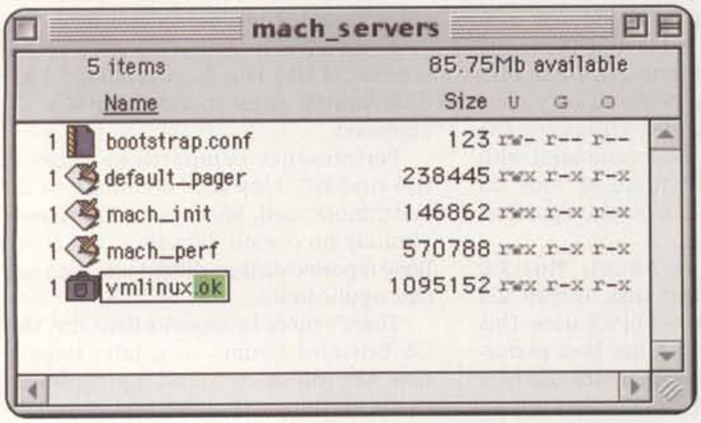
Smaller volumes — those under 1G — show lesser benefits from HFS Plus. While the block size reduction can be proportionally as large as with bigger drives, the absolute saving is less significant.

There is an early lack of HFS Plus-compatible disk tools. Disk First Aid has been updated, of course, but most experienced users want at least one other utility. Unofficial statements from within Symantec suggest a Norton Utilities upgrade will be out in the April-July period, while a major revision of TechTool Pro positioned as a Norton competitor was expected shortly after this writing, as was an HFS Plus compatible version of DiskEssentials. Alsoft may leverage its knowledge of HFS Plus gained in building PlusMaker and PlusMaximiser to bolster Disk Express Pro's diagnostic and repair capabilities.

Other software may fail with HFS Plus if it makes assumptions about the disk format (this may include security programs or those that write directly to a volume for speed), or uses certain undocumented locations in low memory.

Apple recommends "that you do not use a Mac OS Extended HFS Plus formatted volume as your start-up disk unless you have the Mac OS 8.1 CD". Without it, recovering from a hosed start-up disk is a messy business. The company also suggests that you reinstall Mac OS onto HFS Plus volumes rather than dragging the System Folder from another volume, but the underlying issue is that the Text Encoding Converter extension is essential with the Unicode character set used by Sequoia filenames.

Although HFS Plus makes it practical to use multi-gigabyte drives as single volumes, there are still some good reasons for partitioning drives, such as using different block sizes or to reduce the extent of file system damage. I seem to waste too much time shuffling files between partitions to free up enough space for new software, so my plans for an HFS Plus transition include one main partition with a second (on single-drive Macs) that's just big enough for an 'emergency' copy of my System Folder.■



```
mach_servers
5 items                      85.75Mb available
Name                         Size U   G   O
1 bootstrap.conf              123 rw- r-- r--
1 default_pager            238445 rwx r-x r-x
1 mach_init                146862 rwx r-x r-x
1 mach_perf                570788 rwx r-x r-x
1 vmlinux ok              1095152 rwx r-x r-x
```

Using other file systems

The original file system for the Macintosh was MFS (Macintosh File System). Designed for 400K floppies, MFS provided a single directory. Although files could be arranged in folders, this was purely cosmetic and only affected the way files were displayed in the Finder. MFS was supported until Mac OS 8.0, so be sure to copy the contents of any remaining 400K diskettes to another medium before upgrading to 8.1.

The Macintosh has also long had the ability to handle MS-DOS and ProDOS (Apple II) diskettes through Apple File Exchange and more recently PC Exchange. The version of PC Exchange included with Mac OS 8.1 supports Windows 95 long filenames plus VFAT and FAT32 volumes. Other enhancements allow its use with drives bigger than 1G providing they are formatted as FAT32 volumes, and a wider range of removable media such as Jaz cartridges.

When using emulation software such as SoftWindows 95, it is not necessary to use a floppy or external drive to move files between the Windows and Mac environments. A more convenient method is to share a Mac OS folder with Windows, where it appears as an additional drive.

In SoftWindows, choose SoftWindows 95 Setup from the Setup menu, then click the Shared Folders button. Select the drive letter you want to assign to the folder, then click the Change button. Navigate to the folder you want, and click the Use button.

If you run SoftWindows in a window, dragging a Mac folder into SoftWindows 95 automatically assigns it to drive E:.

The main problem with shared folders is that the Mac's 31-character filename limit applies. SoftWindows will not allow files in shared folders to exceed this limit, which can be an inconvenience when copying files. Instead, they are truncated to 31 characters (or more likely 27 plus the extension). For example, a Word 95 file called 'This is a very long file name with over than 31 characters' becomes 'This is a very long file na.doc' in a shared folder. The same file read from a floppy with PC Exchange appears as 'This is a very long fil#FCB.doc'.

File types are another issue. Where Windows uses, for example, the DOC file extension to indicate a Word document, the equivalent Macintosh document has a type of W6BN (for Word 6.0, at least). Both SoftWindows 95 and PC Exchange can map Windows extensions to Macintosh applications.

Support for other formats such as ISO 9660 CD-ROMs has been added through add-ons to the Foreign File Access extension. The latest is UDF Volume Access (part of Mac OS 8.1), for the Universal Data Format as used by DVD and many packet-written CD-R discs.

A utility called LinuxDisks (http://w3.teaser.fr/~mpollet/LinuxDisks/) provides read and write access to ext2 file systems (Linux/MkLinux disks or partitions) from Mac OS with a very familiar interface. Its creator, Michel Pollet, is also working with Benjamin Herrenschmidt on MountX (http://calvaweb.calvacom.fr/bh40), an extension that mounts ext2 file systems directly on the Mac OS desktop.

The intricate science of Linux's booting process. **By Geoffrey Bennett**

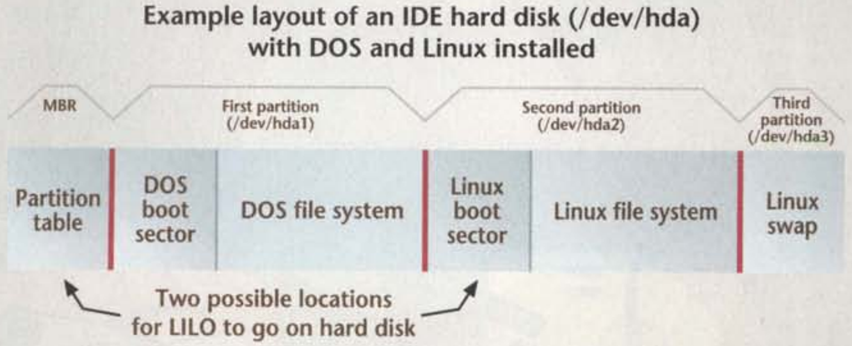
Linux

This article explores what happens when your Linux computer boots, and how to configure it.

To start the Linux kernel running, some sort of boot program ('boot loader') is required. There are a number of different boot loaders available, but the two most popular are LILO and loadlin.

When the Linux kernel starts running, it probes and initialises all the hardware that it knows about and can find. The kernel then moves into the background and starts a program called 'init'. Init is responsible for starting all other services such as your log-in prompt, the system logging service, the printer spooler service, and so on.

Example hard disk layout


Example layout of an IDE hard disk (/dev/hda) with DOS and Linux installed
MBR
First partition (/dev/hda1)
Second partition (/dev/hda2)
Third partition (/dev/hda3)
Partition table
DOS boot sector
DOS file system
Linux boot sector
Linux file system
Linux swap
Two possible locations for LILO to go on hard disk

LILO

LILO is the most common Linux boot loader in use today. It is quite flexible, and can be used to boot DOS/Windows, OS/2, and other operating systems. LILO can be installed on a floppy disk, or onto a hard disk in the Master Boot Record (MBR) or a Linux boot sector.

The MBR of a hard disk serves two purposes. The first is to store a simple program that can be used to start an operating system running. The second is to store the partition table of the hard disk.

The default MBR program does not provide any choice between operating systems at boot time. In the partition table of a hard disk, one partition will be flagged as the 'active' (boot) partition, and the MBR will load the boot record of that partition.

The example diagram shows the location of the MBR and boot sectors on a hard disk.

If LILO is installed in the Linux boot sector, then you would set the Linux partition as the active partition so the default MBR would load LILO, and LILO would then give you the choice of which OS to load. If LILO is installed in the MBR, then the active partition setting would be irrelevant, and LILO would again give you the choice of booting DOS or Linux.

Configuring LILO

The LILO configuration file is usually stored in /etc/lilo.conf, and it is divided up into a number of sections. The first section is for 'global options' which change behaviours of LILO such as where it will be installed and how long LILO should wait before booting into its default operating system. After the global options, there can be one or more sections each of which describes one operating system to boot; these sections define things such as what partition the operating system is located on. The following is an example LILO configuration showing the different sections in lilo.conf:

```
boot=/dev/hda
prompt
timeout=50
other=/dev/hda1
     label=DOS
image=/boot/vmlinuz-2.0.32
     label=Linux
     root=/dev/hda2
     read-only
```

The boot option in the LILO configuration file determines where LILO is to be installed. The example value of /dev/hda means that LILO is to go in the MBR. If you wanted it to be installed in the Linux boot sector as in the example diagram, you would use /dev/hda2, or for a floppy disk you would use /dev/fd0.

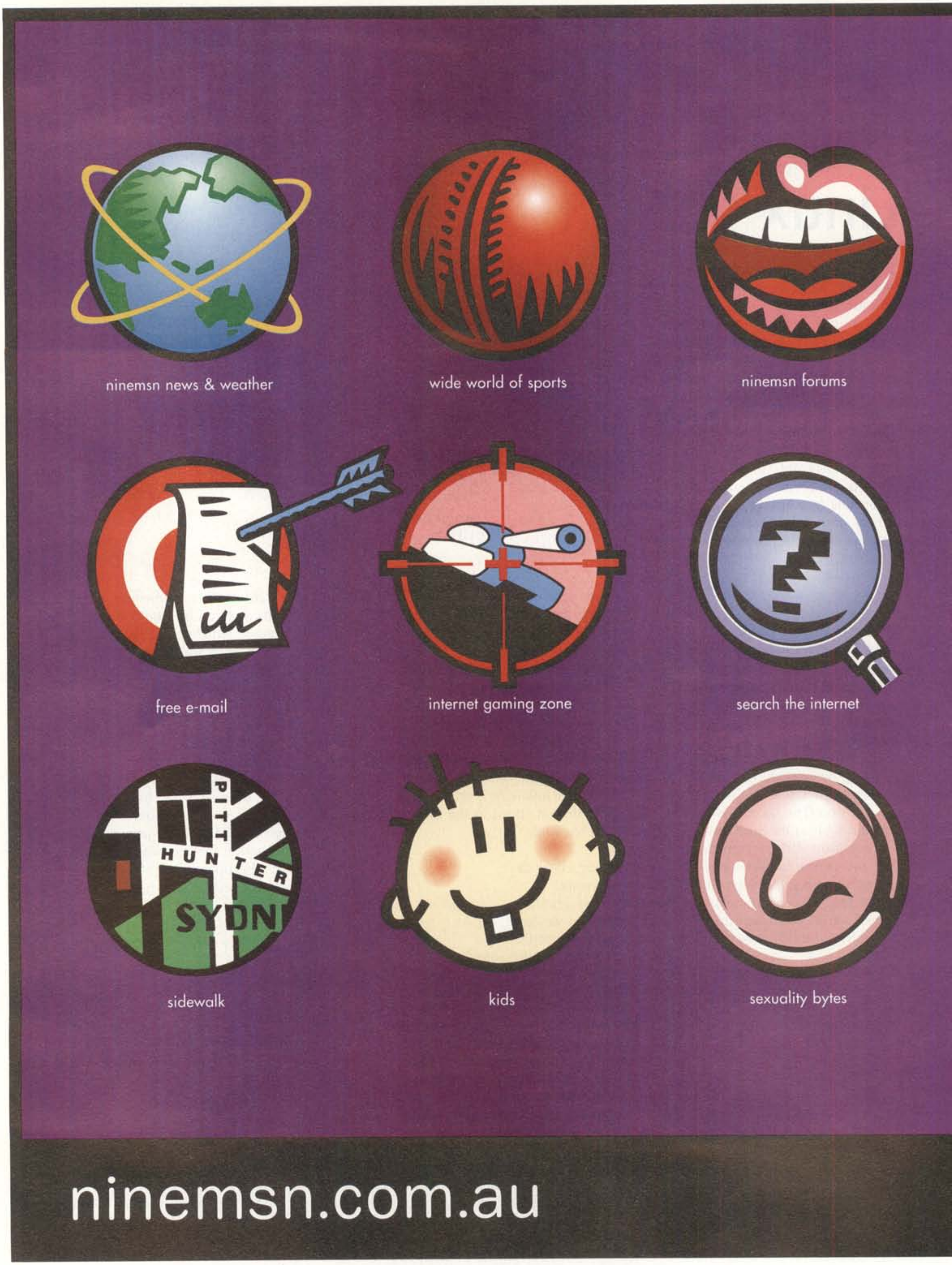
The prompt and timeout options tell LILO that when booting it should prompt the user for an OS to boot, but if nothing is typed within five seconds it should boot the default OS (the timeout is expressed in tenths of seconds). The default operating system is whichever is listed first (in this case, DOS). If the timeout option was left out, LILO would just wait at the prompt until you selected an operating system. If the prompt option was left out, LILO would not prompt you unless you interrupted it during its timeout by pressing a Shift, Ctrl, or Alt key.

A section beginning with the other option allows LILO to boot any operating system by loading its boot sector just as the original DOS MBR program would do. The label option specifies what can be typed to select this operating system.

image sections are used to boot Linux; the filename specified refers to the Linux kernel that is to be loaded. The root option tells LILO where the Linux root file system is stored, and the read-only option specifies that the root file system should initially be mounted read-only (later during the boot, the root file system will generally be remounted read-write).

If there is more than one Linux kernel you wish to boot, you can just add extra image sections. In fact, if you compile your own kernel, it is a very good idea to have one section for your original kernel, and one for your new kernel, just in case your new kernel turns out to be unbootable.

There is a bit of a catch-22 situation that exists when booting Linux using LILO. If the Linux kernel is stored in the


ninemsn news & weather
wide world of sports
ninemsn forums
free e-mail
internet gaming zone
search the internet
PITT
HUNTER
SYDN
sidewalk
kids
sexuality bytes
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Linux partition (like it is in our example), then how does LILO know where to get the kernel from if the kernel (which controls all file operations) is not yet loaded? The answer is that LILO stores the exact location of the kernel on the disk so that it can directly read it in, bypassing the file system structure. The practical result of LILO bypassing the file system structure is that you must run the /sbin/lilo command every time you make any change to the lilo.conf file or to the kernel(s) that are used. If you don't, at best your changes won't take effect, and at worst you won't be able to boot from your hard disk until you reinstall LILO.

If you ever need to uninstall LILO from the MBR of a hard disk, the DOS FDISK program can be used to do so by running it as such: FDISK /MBR. Further information on LILO should be available on your system in the /usr/doc/lilo* directory.

Loadlin

Loadlin is a DOS program that can be used to boot Linux. When run, it will completely replace DOS with the Linux kernel, and then start Linux. There's no way to return to DOS after running loadlin apart from rebooting Linux.

Loadlin is a handy utility for booting Linux if you can't or don't want to use LILO, or if your LILO setup fails. As long as you have a copy of your Linux kernel on a DOS partition, you will still be able to boot Linux.

The most common way of using loadlin is to create a batch file called linux.bat that contains, for example:

```
smartdrv /c
loadlin \linux\vmlinuz root=/dev/hda2 ro
```

The smartdrv line makes sure that any as-yet unwritten disk buffers are written out before Linux is loaded. It is only needed if write-behind caching is in use, but it won't hurt to run it anyway. \linux\vmlinuz is the Linux kernel file you wish to boot. The root= parameter to loadlin tells it where the Linux root file system is, and the ro parameter has the same meaning as the read-only parameter for LILO.

Init

Once the Linux kernel has loaded and has initialised all its device drivers, it will start a program called /sbin/init. This is the very first program to run, and it will always have a process ID (PID) of 1. Every process created from this point on is either directly created by init, or is a 'descendant' process of init; for this reason, init is called the father of all processes.

Standard Linux run levels

Run level	Purpose
0	Halt the system
1	Single-user mode
2	Multiuser without the NFS
3	Full multiuser mode
4	Unused
5	X11
6	Reboot the system

Init's main job is to create processes as defined in its configuration file /etc/inittab. The most important of these processes are the 'getty' processes that it creates. The login: prompt you see on your console is produced by the getty process running on it.

There are two main styles of Init configuration: BSD-style, and SysV-style. The names come from the two main flavours of Unix: AT&T System V Unix, and the Berkeley Standard Distribution.

Both init styles have a concept of a 'run level' which is a configuration of running processes. For example, run level 3 is the normal multiuser run level where all services are running, and run level 1 is the single-user run level where only a few services are running. The 'initdefault' setting in the /etc/inittab file determines what run level the system will start in by default, and you can use the telinit program to switch between run levels interactively. The table above lists the standard Linux run levels.

BSD-style init configuration

The BSD-style init configuration is used mainly by the Slackware Linux distribution. It is configured so that when the system boots, the /etc/rc.d/rc.S script will be run to check the file systems and start any programs that are required to always run. Once the rc.S script has finished, either the rc.K script (for run level 1) or the rc.M script (for run levels 2 through to 5) will be executed.

The rc.M script centralises the startup of all other services. Most services such as the system logger (syslogd and klogd) are started directly by this script, but some services have their own scripts which are called by rc.M, such as rc.inet1 and rc.inet2, which control the setup of network devices and network services respectively. The last script called by rc.M is rc.local, which is for local system additions. If you want a program to be run every time Linux boots, rc.local is the place to add it. Think of it as your AUTOEXEC.BAT for Linux.

System V-style init configuration

The System V-style init configuration is used by most modern Linux distributions, including Red Hat Linux and Debian GNU/Linux. It allows more flexibility than the BSD-style when setting which services are run at different run levels. The initialisation process is divided among many different scripts, one for each service that is available. The scripts are stored in the /etc/rc.d/init.d directory for Red Hat, and in the /etc/init.d directory for Debian. Each of these scripts takes one argument; either 'start' or 'stop', which provides a uniform method for starting or stopping services.

When init goes into a particular run level, the set of services that are started is determined by the contents of a directory which corresponds with that run level. For run level 3, this directory is either /etc/rc.d/rc3.d (for Red Hat), or /etc/rc3.d (for Debian). For each service to be started in a run level, there will be a link from a file named Sxxservice to the script in the init.d for that service, where 'xx' is a number between 00 and 99, and 'service' is the name of that service. For example, the link to start the lpd (printer) service might be called S40lpd. For each service to be stopped, a link with a similar name is used, but with a 'K' for Kill instead of the 'S' for Start.

Each service is started in numerical order, so for example, if there are S10network, S30syslog and S80sendmail links, then the network service will be started before the system logging service, which will be started before the mail transport service.

Manipulating the links by using the ln and rm commands can become tedious, so the Red Hat and Debian distributions both provide a command to help. The Red Hat command is called chkconfig, and the Debian command is called update-rc.d. There are manual pages documenting both of those commands. Also, init itself and its configuration file are documented in the init(8) and inittab(5) manual pages respectively.■

Today's Windows developer is presented with an overwhelming choice of tools. It is quite possible to develop useful Windows applications without writing a line of code. **By Michael Smith**

Developers Corner

Under the Windows hood

Tools like Visual Basic and Delphi allow you to work through a few wizards and see a fully functional program emerge automagically. Even the C/C++ developer can now generate large portions of an application using tools like Visual C/C++ and Microsoft Foundation Classes (MFC).

In general, this is a good thing. However, sometimes it is helpful to understand a little of the internals of a program. This month we will scratch the surface, in the gentlest possible way, and next month we'll take it just a little further.

Our example will be written in C and designed to work with Microsoft C compilers. C is the language of choice for a task like this as the original Windows API was developed for C programming. Over recent years, C++ has become much more popular for Windows development. One of the main reasons for this is that in C++ it is easy to hide some of the complexity of the Windows API. Today we don't want to hide the complexity. We'll view the Windows API in all of its ugliness and conquer it (hopefully). I have chosen Microsoft C simply because I have a copy handy. On the whole it is no better nor worse than its competitors for this task.

Where's the main()?

```
#include <windows.h>
#include "mtools.h"

LRESULT CALLBACK WndProc (HWND,
UINT, WPARAM, LPARAM) ;

int WINAPI WinMain( HINSTANCE hIn-
stance,
              HINSTANCE hPrevInstance,
              PSTR szCmdLine,
              int iCmdShow )
{   static char szAppName[]   = "HelloAPC";
    static char szAppCaption[] = "The Hello
Program";
   HWND        hwnd;

   if (!hPrevInstance)
        mt_register_class( hInstance,
                          szAppName,
                          WndProc );

    hwnd = mt_create_default_mainwin( hIn-
stance,
                          szAppName,
                          szAppCaption,
                          iCmdShow );
    if (!hwnd) return EXIT_FAILURE;

    return mt_mainloop();
}
```

The first thing you will notice about a Windows program is that it has no main() function. This is replaced by the WinMain() function. The arguments for this function are also unfamiliar. The developers at Microsoft, in their wisdom, decided to change the standard format for C programs. Most C programmers hate this, but we're pretty much stuck with it. Let's look at the arguments:

hInstance A handle to the current 'instance' of the program. This handle is used to register the window class.

hPrevInstance A handle to the previous instance of the program. Under the Win16 API, programs shared a certain number of resources. If another instance of the program was in memory it was unnecessary to register the window class. With the Win32 API this is no longer the case. hPrevInstance is always NULL (0). If you need to know about other instances of the program, you must resort to even more arcane methods (which I will not expand on here).

szCmdline The entire program command line, excluding the program name (argv[0]).

iCmdShow A flag requesting the initial state of the program. Many obscure states are available, though you will typically only see three common ones: SW_SHOWNORMAL, open the main window in a normal manner; SW_SHOWMAXIMIZED, open the main window in a maximised (full-screen) state; and SW_SHOWMINNOACTIVE, open the main window in a minimised (iconised) state.

The WinMain() function typically performs only three functions: register the window class, create the main window, and then execute an event loop. We'll look at each of those tasks individually.

The window class

```
#include <windows.h>

void WINAPI mt_register_class( HINSTANCE
hInstance, char *szAppName,
                    WNDPROC WndProc )
{
   WNDCLASSEX  wndclass;

   wndclass.cbSize              = sizeof( wnd-
class );
wndclass.style                  =    CS_HRE-
DRAW| CS_VREDRAW;
   wndclass.lpfnWndProc         = WndProc;
   wndclass.cbClsExtra          = 0;
   wndclass.cbWndExtra          = 0;
   wndclass.hInstance           = hInstance;
   wndclass.hIcon =   LoadIcon(  NULL,
IDI_APPLICATION );
   wndclass.hCursor             = LoadCursor(
NULL, IDC_ARROW );
   wndclass.hbrBackground = (HBRUSH)
GetStockObject( WHITE_BRUSH );
   wndclass.lpszMenuName  = NULL;
   wndclass.lpszClassName = szAppName;
   wndclass.hIconSm             =    LoadIcon(
NULL, IDI_APPLICATION );

   RegisterClassEx( &wndclass );
}
```

This task consists entirely of initialising the WNDCLASSEX data and calling the registration function. Let's look at some of the WNDCLASSEX properties:

cbSize Specifies the size, in bytes, of this structure. Set this member to sizeof(WINDOWCLASSEX).

style Specifies the class style(s). Styles can be combined by using the bitwise OR (|) operator. There are too many style values to list here. The two styles used in our example, CS_HREDRAW and CS_VREDRAW, cause the Window to be completely redrawn when the horizontal and vertical size is changed. This is not always desirable, but it is appropriate for our example.

lpfnWndProc Function pointer for the Window Procedure which will handle all of the window's messages. More on this later.

cbClsExtra Specifies the number of extra bytes to allocate following the window-class structure. The operating system initialises the bytes to zero.

cbWndExtra Specifies the number of extra bytes to allocate following the window instance. The operating system initialises the bytes to zero.

hInstance A handle to the current instance of the program.

hIcon A handle for the class icon.

hCursor A handle for the class cursor.

hbrBackground A handle for the background brush.

lpszMenuName A string specifying the class menu name, or NULL if no menu is used.

lpszClassName The name of the class.

hIconSm A handle to a small icon associated with the class.

Creating the main window

```
#include <windows.h>

HWND WINAPI mt_create_default_mainwin(
        HINSTANCE hInstance,
        char *szAppName,
        char *szAppCaption,
        int iCmdShow )
{
    HWND hwnd = CreateWindow (
      szAppName,        /* window class name */
      szAppCaption,     /* window caption */
      WS_OVERLAPPEDWINDOW,/*
        window style */
      W_USEDEFAULT, /*initial x position */
      CW_USEDEFAULT, /* initial y position */
      CW_USEDEFAULT, /* initial x size */
      CW_USEDEFAULT, /* initial y size */
      NULL, /* parent window handle*/
      NULL, /* window menu handle */
      hInstance, /* program instance handle */
      NULL ); /* creation parameters */

      if ( hwnd ) {
      ShowWindow( hwnd, iCmdShow );
      UpdateWindow( hwnd );
      }

      return hwnd;
}
```

The CreateWindow() function creates the window (big surprise), but it does not make it visible. After creating the window we then call ShowWindow(), which makes the window visible, then UpdateWindow(), which causes a W_PAINT message to be sent to the window.

Naming conventions

Many Windows developers use a variable naming convention that is sometimes known as Hungarian Notation. It was invented by the Microsoft programmer Charles Simonyi. Each variable name is given a prefix which indicates its type. So 'hWnd' is a handle and 'bDone' is a boolean. There are a few variations, but here is a typical list:

b or **f**	BOOL (int); f stands for flag
by	byte
c	char
n	short
w	WORD (unsigned short)
i	int
x, y	int (used as x and y coordinates)
cx, cy	int (used as x and y length; c stands for count)
l	long
dw	DWORD (unsigned long)
s	string
sz	string terminated with a zero byte
h	handle
p	pointer
fn	function

The message loop

```
#include <windows.h>

int WINAPI mt_mainloop( void )
{
  MSG       msg;

  while (GetMessage (&msg, NULL, 0, 0)) {
    TranslateMessage (&msg) ;
      DispatchMessage (&msg) ;
  }
  return msg.wParam ;
}
```

As is normal for a Windows program, our WinMain() doesn't actually do very much. After performing the basic initialisation, WinMain() spends the rest of the program in a tight loop, processing and distributing messages. Messages are generated by a key press, moving or clicking the mouse, selecting a menu item, just about anything that happens to the computer. The message loop identifies which window should handle each message and forwards it. The window procedure then processes these messages, and that's where the real work gets done.

The window procedure

```
#include <windows.h>

LRESULT CALLBACK WndProc( HWND
hwnd,
          UINT iMsg,
          WPARAM wParam,
          LPARAM lParam )
{
  HDC      hdc;
  PAINTSTRUCT ps;
  RECT      rect;

  switch (iMsg)
  {
    case WM_CREATE:
      return 0;

    case WM_PAINT:
      hdc = BeginPaint( hwnd, &ps );

      GetClientRect( hwnd, &rect );

      DrawText( hdc,
              "Hello, APC Readers!",
              -1,
              &rect,
              DT_SINGLELINE |
                DT_CENTER |
                DT_VCENTER );

      EndPaint( hwnd, &ps );
      return 0;

    case WM_DESTROY:
      PostQuitMessage( 0 );
      return 0;
  }

   return DefWindowProc( hwnd, iMsg,
wParam, lParam );
}
```

There are hundreds of possible messages the window procedure can receive. Typically, a program is only interested in a few of them. The window procedure processes any messages you choose, then returns 0 to indicate that the message has been handled. For any message you don't wish to handle, you call the default window procedure, which is supplied by the compiler library.

The result

The result is a simple, working application. It doesn't do much that is useful, but it provides a basic framework on which to build.

Time and space have run out for this month. Next month we will add a few more features to our application. The source code is available on **apcmag.cd** if you want to play with it.■

This month's JavaScript column covers the remaining methods and operators in the JavaScript language. **By Travis Simon**

JavaScript

If you've been reading this column every month, you should by now have a grasp of most of the major language constructs. There are, however, a few details that have been skimmed over along the way due to space and time constraints. For this month's JavaScript article we will revisit some of those concepts.

The 'for . . . in' loop

We have already seen 'for' loops in JavaScript. A for loop is used to loop through a block of statements for a specific number of iterations. The 'for . . . in' loop is similar to the for loop, except that instead of working with a conditional statement to end the loop, the for . . . in loop works with objects. The for . . . in construct is used in conjunction with a JavaScript object to loop through its properties. The syntax for the loop is:

```
for(variable in object)
        statements;
```

When a browser encounters this construct, it will loop through all of the properties of the specified object, assigning each one to the variable. This variable can then be used inside the statement block, acting as a reference to the property. For example, the following code could be used to print out the properties of the document object:

```
for(i in document)
        document.writeln(i + "<br>");
```

The code above would loop through each property of the object, printing the name of each property, until it reached the last property. To be honest, the only time that I have ever used the for . . . in looping construct was to print out the properties of an object, and only because I had forgotten them! This is not to say that you won't put the for . . . in loop to some good use, but so far, I haven't needed it.

The eval() method

The 'eval()' method is a standalone JavaScript method, and is not bound to any object. Its function is to execute the contents of a string as if it were a statement in a script. If the string argument is a JavaScript statement (as opposed to a program instruction), the eval() method will evaluate to the value of the statement. For example, you could store a statement inside a variable, and then execute it later using the eval() method:

```
var myStatement = "alert('Hey, check this
        out!');";
eval(myStatement);
```

Once again, I have never used the eval() method. However, this could be because I forgot about it for a while. The eval() method is most likely to be of use in conjunction with form objects. For example, a function might require the name of an object to be sent as an argument, and then one of its properties might be manipulated using the eval() method. For example, a function that set the checked property of a checkbox object (sent as an argument to the function) might look like this:

```
function setChecked(theObject)
{
eval(theObject + ".checked = true");
}
```

The parseInt() and parseFloat() methods

The parseInt() and parseFloat() methods both convert string representation of numbers into their numeric equivalents. As you might have guessed, the parseInt() method converts a string into an integer, and the parseFloat() method converts a number to a floating point number. An integer is a whole number (no decimal places), and a floating point number can contain fractional parts.

According to Netscape's language specifications, the parseInt() method will accept an additional argument specifying the radix (or base) to which the number is to be converted. Specifying a base of 16, for example, should convert the number to a hexadecimal number. However, a quick test has shown this feature to be unreliable, so it is my recommendation to do the calculations yourself.

The following method illustrates the parseFloat() method. The code asks the user for the radius of a circle, and then calculates the area based on the input:

```
var radius = prompt("Enter a circle radius.",
        "1");
var area = Math.PI * parseFloat(radius) *
        parseFloat(radius);
document.writeln("radius: " + radius + "
        area: " + area);
```

Finally, if the string argument does not begin with a positive (+) or negative (-) sign, or numeric characters, the parse methods return NaN (Not a Number). On some older browsers, invalid arguments may cause the parse methods to return 0, although this is rare. Remember these two methods — if you do enough JavaScript programming, you will certainly utilise them at some point.

The bitwise operators

The JavaScript language includes a number of bitwise operators for bit-level manipulation of data. All bitwise operators work on binary (base 2) numbers. The more familiar decimal numbering system works with 10 digits, 0 to 9. Binary numbering, on the other hand, only uses two numbers, 0 and 1.

Conceptually, binary numbering works in the same way as decimal numbering. Given a three-digit number, say abc for this example, each digit (starting from the right-hand side) is multiplied by the power of the radix corresponding to the digit's place in the number. Those totals are then added together. In our hypothetical example, the total value for the number is $(a * (radix)^0) + (b * (radix)^1) + (c * (radix)^2)$. If the base is 2 (binary), and the number is 110, you can find the decimal equivalent by using the following calculations: $(0 * 2^0) + (1 * 2^1) + (1 * 2^2)$ or $0 + 2 + 4 = 6$.

Binary notation is often used in programming because all information is stored in memory in binary notation (as a string of bits, representing either 1 or 0). The bitwise operators allow programmers to operate on data as a string of bits, as opposed to the more familiar alphanumeric representations.

The first bitwise operator is the bitwise AND operator. The bitwise AND operator will return a 1 in a specific bit position only if the corresponding bits in the two operands is 1. For example, the number 15 is represented in binary notation as 1111. The binary notation for the number 10 is 1010. The bitwise AND compares the digits in each place holder, and returns 1 where both place holders are 1. In this case, the result is 1010 (10).

The syntax for the bitwise AND operator is:

```
result = operand1 & operand2;
```

The bitwise OR operator works similarly to the bitwise AND operator, except that it will return a 1 for a bit position if either bit is 1. In the previous example, bitwise ORing 10 and 15 will return 1111 (15).

The syntax for the bitwise OR operator is:

```
result = operand1 | operand2;
```

The next operator is the bitwise XOR. The XOR operator functions similarly to the bitwise OR operator, with a slight difference; the XOR operator returns 1 if either operand is 1, but not both. For example, bitwise XORing 10 and 15 will return 0101 (5).

The syntax for the bitwise XOR operator is:

```
result = operand1 ^ operand2;
```

Following along the lines of the logical operators, the next bitwise operator is the bitwise NOT operator. The bitwise NOT operator works on a single operand, reversing the value of each bit. For example, using the bitwise NOT operator on the value 1111 (15) will return 0000 (zero).

The syntax for the bitwise NOT operator is:

```
result = ~operand1;
```

The next class of bitwise operators is the bitwise shift operators. The shift operators move the values of the individual bits to the right or left a specified number of place holders. The first shift operator is the left shift operator. The left shift operator will shift the values to the left a specified number of places, while shifting in zeros from the right. For example, the value of 10 (1010) left-shifted two places is 40 (101000).

The syntax for the bitwise left shift operator is:

```
result = operand1 < operand2;
```

The next bitwise shift operator is the sign propagating right shift. When a computer stores a negative number, the first bit is used to represent the sign of the number. Now imagine a negative number being right shifted — the bit that used to be the sign bit would be moved, changing the value to positive, and increasing the number exponentially (the former sign bit would be (n - 1) positions away from the highest place holder). To prevent this from happening, the sign propagating right shift operator tracks the sign of a number and maintains it after a shift. For example, the value of ten (1010) right shifted two places is 2 (10).

The syntax for the bitwise sign propagating right shift operator is:

```
result = operand1 > operand2;
```

Although you're sure to be disappointed, there is only one more bitwise operator — the zero fill right shift operator. The zero fill right shift operator works in a similar way to other right shift operator, except that it does not maintain the integrity of the sign bit. Be certain that this is the operator you really want when using it, or you will end up with some horrendous bugs in your programs!

The bitwise operators are not likely to be of great use in JavaScript. In other languages, they can offer substantial performance benefits (such as using the left shift operator to multiply by powers of two — it's often much more efficient to use the bitwise operators). It is likely that at some point during your programming career that you will come across program code using the bitwise operators, and too much knowledge is always better than too little.

The conditional operator

The conditional operator is JavaScript's only ternary (takes three operands) operator. The conditional operator is simply a shorthand method of the IF/THEN construct. Its syntax is:

```
(condition) ? value1 : value2;
```

If the conditional evaluates to true, the statement evaluates to value1; if the conditional statement evaluates to false, the statement evaluates to value2. For example, the following code would assign a string to a weather variable based on the value held in the temperature variable:

```
weather = (temperature > 20) ? "hot" :
"cool";
```

If the value in temperature is greater than 20°, the statement will assign the string 'hot' to the weather variable. Otherwise, the string 'cold' is assigned to the weather variable.

The with statement

The 'with' statement is a grouping statement that provides a convenient method of creating implicit object references. For example, the alert method makes an implicit call to the window object. Without this reference, it would be necessary to type:

```
window.alert("Hello there.");
```

every time you wished to use the alert method. The with statement provides the same convenience for any object. The syntax for the with statement is:

```
with(Object_Name)
        statement(s);
```

For example, you could use the with statement to make implicit calls to the document object:

```
with(document)
        {
        bgColor = "#FFFFFF";
        writeln("This call to the writeln()
method is being made with an implied refer-
ence to the document object.");
        }

document.writeln("This one is not.");
```

Using the with statement on the document object is fairly superficial. However, if you work with frames and forms, the with statement can provide great benefits. Consider the following situation, where a script needs to access a form object that happens to be located on the first frame of a document whose other child document opened the parent frame of the script. Got that? Anyway, in code it would look like:

```
with(parent.opener.parent.frame1.the-
Form.viewBy)
    {
    if(options[0].selected) ;
    else if(options[1].selected;
    ...
    }
```

If the form's selection list had numerous options, the with statement could save you from developing a nasty case of RSI.

Until next month, send any questions or comments to trav@acp.com.au.■

Learn how to put your home database on the Web. **By Lee Borkman**

HyperText

For a while now we have concentrated on the details of HTML scripting — what tags do you need and how do you use them to get your Web pages to look just the way you want? Well, let's assume (a dangerous habit) that we all have a fair idea of how to go about that. It's time to move on to the next step — automation. I know we've looked at CGI scripting before, and we've even used JavaScript to generate HTML on the fly, but this month we're going to take a major step towards real Web power. We're going to introduce the database.

In honour of Bill Gates' visit in March, I'm going to be using Microsoft Access (though really because it is as common as mud), but the techniques can be ported to any database software.

Here's a fairly common situation. You are a small-businessperson, using the World Wide Web to advertise your business. Your Web site is hosted by a third-party ISP; you have no control over the server software, and your ISP certainly doesn't encourage CGI scripting. In practical terms, all you can do (all you *want* to do) is use FTP to upload static content. Nevertheless, you have a substantial amount of fiddly data that needs to be published, and it changes on a regular basis. It's the same data that you use to create your paper leaflets, the same data that you place in the local newspaper's classifieds section.

If you're clever, you keep all of this information in a place where you can easily modify it, where you examine it from a number of angles, and (most importantly) where it can be reused. You keep your data in a database.

Home database software like Access is getting pretty cute these days, and often includes options for exporting to HTML. Reports, in particular, are a useful way of assembling your data into some meaningful form, and Access will do a good job of rendering all of your reports as HTML. I suggest you try it — it might be just what you are looking for. On the other hand, I urge you to take a look at the underlying HTML that an Access report produces. It's not a pretty sight.

If you don't have the latest 'Web-enabled' database software, you can still use a database query to get the data you are looking for. If you copy the entire resulting table you can paste it into a WYSIWYG editor like FrontPage, or Netscape Gold, but that's a hassle, and once again the results aren't spectacularly attractive.

In coming months we will look at real-time database connectivity, where a Web server talks to our database in real time and generates Web pages on the fly. Using Open Database Connectivity (ODBC) tools like Microsoft FrontPage and Netscape LiveWire will give us excellent control over our HTML code, and allow complete two-way real-time information exchange. That's a great way to go when you have some access to your server's software, especially if it's running on a Windows NT platform. But what about a system that allows the regular generation of a static Web site? (Don't be scared by the word 'static'. A static site can change every hour, if you want. The word simply means that the site is not generated on the fly, but consists of actual stored HTML files.)

No, in this column we are going to use a database to help assemble HTML; that is, put it together with care and with precise control. For that, we will need to use more than the simple Export To HTML option.

By way of example, I'm going to consider the case of a small independent cinema. It shows many different films throughout the year. The objective is to have a Web site that provides a timetable of all films that will be shown during the next fortnight, with links to pages describing each of these films in some detail. For this example, each film will have (at minimum) a Title, a Description, a StartDate and an EndDate. This data will be stored in a single database table, called tblMovies, and Access will give each film a unique MovieID number. That table might look a little like this:

```
MovieID
Title
StartDate
EndDate
Description
1
The Godfather
22-Mar-98
23-Mar-98
A film that does not mention the Mafia.
2
Dr Strangelove
25-Mar-98
03-Apr-98
Peter Sellers tries to bite his own hand off.
3
Stagecoach
29-Mar-98
06-Apr-98
Johns Ford and Wayne, and their first biggie.
4
Titanic
31-Mar-98
04-Apr-98
Whoops.
5
Much Ado about Nothing
31-Mar-98
02-Apr-98
Kenneth and Emma and Bill.
```

Next, we need to design a query (call it qryCurrentMovies) that returns all of the movie data, but only for films that will be shown during the next fortnight. That means the StartDate must be earlier than 14 days from now, and that the EndDate must be later than now (think about it). Use Access' query design tools to produce a query like this one (that's all the help I'm giving here — this isn't meant to be a database workshop).

```
SELECT tblMovies.*
FROM tblMovies
WHERE (((tblMovies.StartDate)<DateAdd
("d",14,Now())) AND ((tblMovies.End-
Date)>Now()));
```

If that query, an interesting mix of SQL and Microsoft Access Basic, is run on 24-Mar-98, it returns all of the films listed above, except for 'The Godfather', which has already ended.

We will soon be creating another query that assembles this data into beautiful HTML, but before that, we need to make another table that is filled with HTML components. Let's assume that our (very) basic HTML page, describing a single movie, looks like this:

```
<HTML>
<HEAD>
```

```
<TITLE>The
Godfather</TITLE>
</HEAD>
<BODY>
The Godfather<P>
A film that does not mention the Mafia.
</BODY>
</HTML>
```

Let's make a table called tblHTML. It contains pieces of HTML code, each with a name. It might look like this:

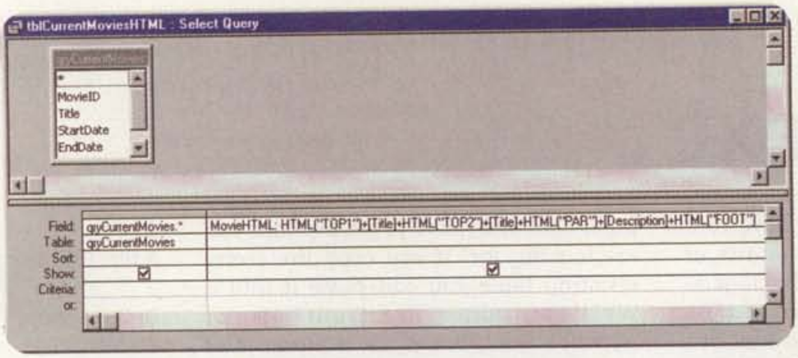
Name	Content
FOOT	</BODY> </HTML>
PAR	<P>
TOP1	<HTML> <HEAD> <TITLE>
TOP2	</TITLE> </HEAD> <BODY>

There are a couple of things to note here. First, there is no separate ID number given to the HTML pieces. That is because they will be identified by their Names, which must themselves be unique. Second, the Content fields include carriage returns, which will result in legible HTML. In Access, there is a special data type called 'memo' which can contain any length of ASCII text, including tabs and returns. Be warned, however, you will want to create an Access form for populating the tblHTML table. Forms are the easiest way to enter multiline text.

We can now get at our HTML pieces by using the DLookUp function, for example: DLookUp("Content","tblHTML", "Name='FOOT'"), which will return the text of our FOOT component.

That's a little cumbersome, so I suggest that you create a Visual Basic function, HTML(), which takes the name of the HTML component as its only parameter, and returns the component's content. We'll assume you've done that (what's that, you want a VB tutorial as well?). For the curious, here is the VB function:

```
Public Function HTML(HTMLName As String) As String
Dim Criterium As String
Criterium = “NAME=” + “‘” + HTMLName
+ “’”
HTML = DLookup(“Content”, “tblHTML”, Criterium)
End Function
```



tblCurrentMoviesHTML : Select Query

Field:	qryCurrentMovies.*	MovieHTML: HTML("TOP1")+[Title]+HTML("TOP2")+[Title]+HTML("PAR")+[Description]+HTML("FOOT")
Table:	qryCurrentMovies	
Sort:		
Show:	☑	☑
Criteria:		
or:		

Now we can create our query that will assemble the movie data into HTML. Call the query 'qryCurrentMoviesHTML'. The query result will contain all of the rows and fields from the qryCurrentMovies query, and will also contain a 'calculated field', called MovieHTML, which concatenates all of text data together, in the correct order, and inserts the appropriate HTML.

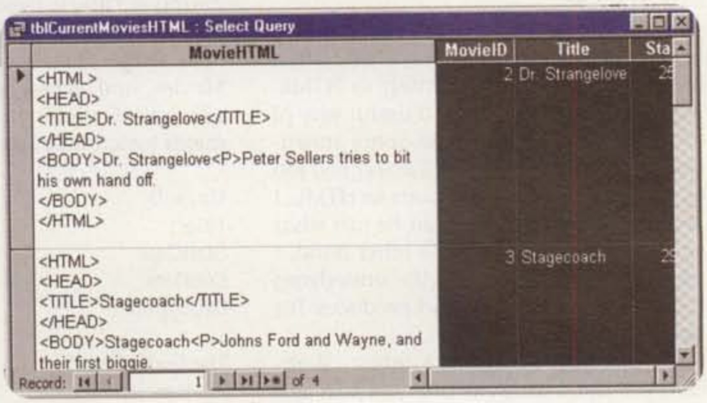
The qryCurrentMoviesHTML query neatly assembles HTML content from our movie data and HTML component tables. From here, there are just a couple of points that need tidying up. First, how do we get the assembled HTML from the query into a collection of freestanding HTML files? You don't want to sit there cutting and pasting all day. I mean, that's the whole point of automation, right? And second, how do we create the main timetable page that links to our movie description pages? Both of these are accomplished using some simple (if ugly) Visual Basic code. I'm not going to give you the code here, but for a basic idea . . .

I suggest you create a simple form with a single GENERATE command button on it. Add your code to the button's OnClick event procedure (you may have to read the manual!). The code, which uses a standard brute force approach, loops its way through the qryCurrentMoviesHTML query records, takes the text from the MovieHTML field, and uses the Open and Print# commands to write the HTML to a simple text file called movie1.htm, or movie2.htm, depending on the ID number of the movie. You may need to study Access recordsets for half an hour before embarking on this project, but rest assured that the final code won't come to more than 15 lines of pretty basic Basic.

As for the main timetable page, that is built by opening another text file, timetable.htm, before you begin looping through the qryCurrentMoviesHTML recordset. At every record in the query's result, as you write to its own separate HTML file, you also add another movie title and hypertext link to timetable.htm. Don't forget to close your text files when you have finished writing to them.

It should go without saying that the data in your database can be reused for creating paper reports and advertising, that it can be linked into a stocktake system, and so on. Once the information has been entered (and checked) you can use it in any number of ways. This is when you will begin to see real gains in using a database. The concept is sometimes called Write-Once-Use-Often.

So why not delve a little into your basic suite of office software? You will find that there is some power lurking under the hood, and that it can all make your life a bit easier. After all, the Web is meant to be a hotbed of creativity, not a life sentence with hard labour. Spend your sleepless nights designing glorious pages, and let your software slaves do the drudge work. The results will be greater control, fewer mistakes, and more free time for thinking sublime thoughts. Until next month, best of luck.■



tblCurrentMoviesHTML : Select Query

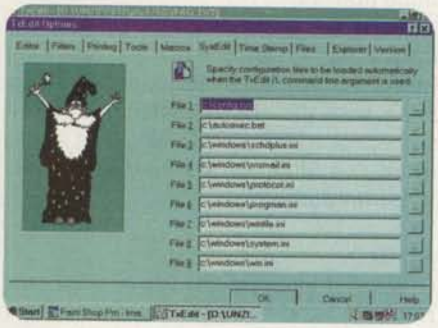
MovieHTML	MovieID	Title	Sta
<HTML> <HEAD> <TITLE>Dr. Strangelove</TITLE> </HEAD> <BODY>Dr. Strangelove<P>Peter Sellers tries to bit his own hand off. </BODY> </HTML>	2	Dr. Strangelove	25
<HTML> <HEAD> <TITLE>Stagecoach</TITLE> </HEAD> <BODY>Stagecoach<P>Johns Ford and Wayne, and their first biggie.	3	Stagecoach	29

*Each month this page lists all the Shareware files to be found on **apcmag.cd**. Simply browse to the Workshop section to find the files and related reviews.*

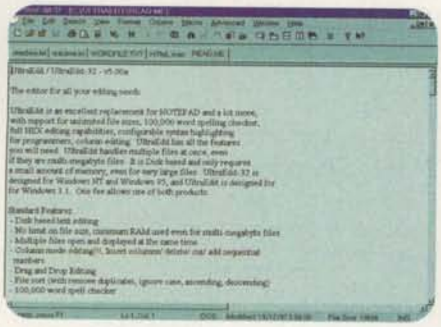
Shareware summary

Windows 95

TxEdit for Windows 95/NT 3.9
Well-presented freeware text editor with multiple file handling, text macros of up to 2,000 characters, program launcher and numerous set-up options.



UltraEdit-32 5.0a
High-powered multipurpose text and hex editor with spell checker, tabbed multiple document interface, powerful macro facilities, launcher for external programs (for example, compilers), and syntax highlighting for source code files.



Frogbit 1.01
Small but powerful line-oriented programming language for manipulating text files and data stored in ASCII format. Has comprehensive Help files and example programs.

BK ReplaceEm 1.7
Well-designed search and replace utility designed to handle multiple files simultaneously; has many useful options.

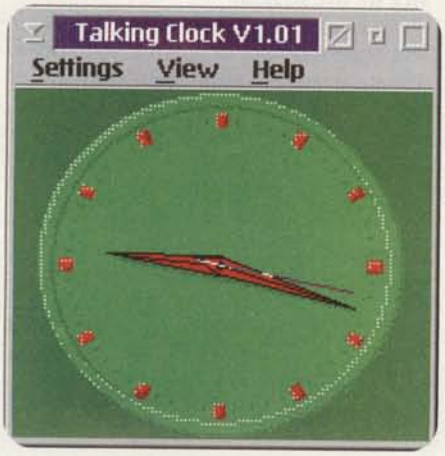
GWD Text Editor 2.0 Beta
Full-featured editor with MDI, basic spell checking and text formatting, launcher for external applications or DOS commands, and syntax highlighting. Has powerful macro facilities, including ANSI C compatible scripting language, and can import text from several popular word processor formats.

Site of the month
Winfiles.com
If you want a software archive that's guaranteed to have it all (almost), then http://www.winfiles.com is certainly the place. A very well-designed site with a comprehensive archive of all things Windows.

OS/2

Albatros Media Player 2.0b
From the programmer who brought you the legendary Gravis UltraSound OS/2 drivers comes a fully functional multimedia 'centre'! It dices, it slices — but seriously, this media player will play just about everything, and the good news is if your file format isn't supported, it probably will be in a future release.

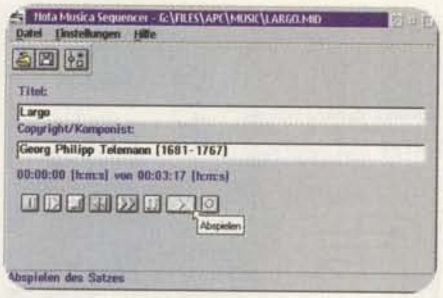
Talking Clock Application 1.0
This is just like the old Windows 3.11 clock, only it talks to you. Talking Clock Application looks like a normal desktop clock. There are digital and analog modes, a removable second hand, and fully customisable colours.



TMixer 1.5
If you have an MPU-401 based soundcard, then you can use this package. A command line-based soundcard mixer, it is easy to install and simple to use.

ACCU Music System for OS/2 3.5
This is a simple text-based musical sequencer and notator. Although not visually impressive, ACCU Music System is surprisingly powerful, especially when it comes to transposition and printing scores.

Nota Musica Sequencer 1.02
Nota Musica is really just a glorified MIDI file player and recorder. You can record from an external MIDI keyboard, name your track and save author information, but that's about it. Supports VoiceType format.



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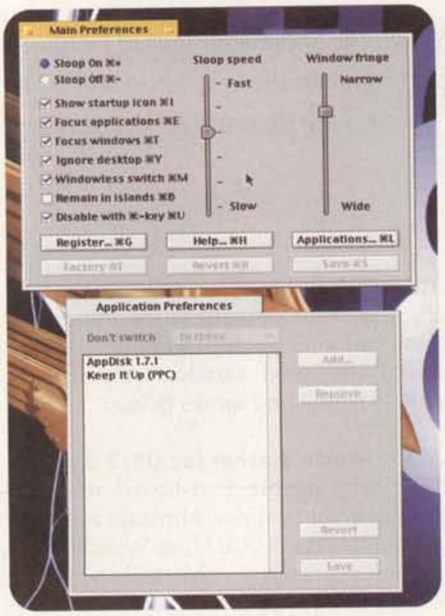
Copyright/Komponist:
Georg Philipp Telemann (1681-1767)
00:00:00 [h:m:s] von 00:03:17 [h:m:s]

Abspielen des Satzes

Site of the month
Tucows OS/2 software archive
Yes, Tucows has an OS/2 archive (http://os2.tucows.cairns.net.au) to complement its popular Windows collection. Surprisingly, Tucows OS/2 is very well done and quite comprehensive. There's even an Australian mirror. If you want a site that lists new OS/2 software while maintaining a comprehensive OS/2 archive, check out Tucows OS/2.

Mac

Sloop 1.0.2v2
Sloop is an extension which provides cursor focusing to Mac OS. Whichever window the cursor floats above is selected as the primary, so that window, and the

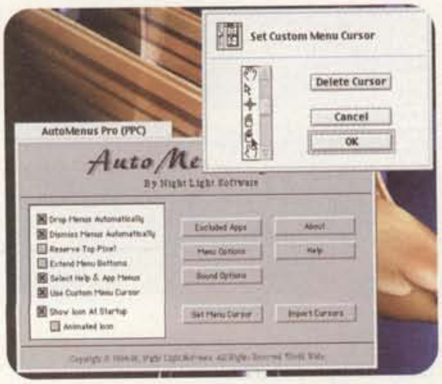


● Sloop On ⌘=
○ Sloop Off ⌘-
☑ Show startup icon ⌘I
☑ Focus applications ⌘E
☑ Focus windows ⌘T
☑ Ignore desktop ⌘Y
☑ Windowless switch ⌘M
☐ Remain in islands ⌘B
☑ Disable with ⌘-key ⌘U

AppDisk 1.7.1
Keep It Up (PPC)

application associated with it, are brought to the foreground.

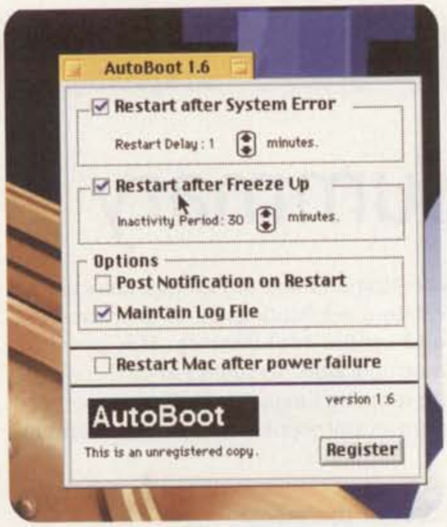
AutoMenus Pro 3.2.3
Where Sloop switches windows and applications without clicking, AutoMenus Pro can be used to access menus without clicking the mouse.



☒ Drop Menus Automatically
☒ Dismiss Menus Automatically
☐ Reserve Top Pixel
☐ Extend Menu Bottoms
☒ Select Help & App Menus
☒ Use Custom Menu Cursor
☒ Show Icon At Startup
☐ Animated Icon

AppDisk 1.7.1
RAM Disks are the result of instructing the Mac OS to treat a portion of RAM as a hard disk volume. They can be used to speed up common tasks (using the RAM Disk to store files or applications), or to save battery life on a PowerBook (storing the System Folder on a RAM Disk). AppDisk is an application that simplifies creating and managing RAM Disks on all Macintoshes.

AutoBoot 1.6
AutoBoot is a combination Control Panel and Extension designed to maximise the uptime of system running without constant supervision. AutoBoot recognises system failures, freezes and power outages, and responds by restarting the Mac and including the event in a log.



☑ Restart after System Error
Restart Delay : 1 minutes.
☑ Restart after Freeze Up
Inactivity Period : 30 minutes.
☐ Post Notification on Restart
☑ Maintain Log File
☐ Restart Mac after power failure
version 1.6
This is an unregistered copy.

Keep-it-Up 1.4
From the same author as AutoBoot, Keep-it-Up is an application which keeps an eye on other applications. Make an application known to Keep-it-Up by dropping an alias in the Keep-it-Up Items Folder, and Keep-it-Up will check that it is running. Should the application crash out without crashing the system, Keep-it-Up will restart and keep a log.

File Typer 5.3
File Typer is a useful tool for dealing with resource fork-less files, such as those from PC or Unix systems. Some applications refuse to open files which do not carry a creator code and file type that they recognise, even when the file is in a format they support. Thus, sometimes it can be necessary to modify these parameters in order to gain access to a useful file.

Site of the month
Rhapsodyos.com
Visit http://www.rhapsodyos.com to get the latest news, reviews, tips and information about Rhapsody, its applications, and how to make the most of it. A must-see site for every Mac user.

Linux

FTE
FTE provides many of the features offered by commercial text editors, and should be of particular interest to programmers who have previously worked in DOS-like environments.

Xcoral
Xcoral is an editor developed for use in the X environment, and features multiple document support and specialised programming functions.

Cool Edit
Cool Edit has been developed by Paul Sheer with the aim of providing an X11 text editor with a similar look and feel to those available for Macintosh and MS Windows platforms.

NEdit
Developed by programmers at the Fermi National Accelerator Laboratory, NEdit is a Motif-based text editor available for a variety of Unix platforms and VMS.

Yudit
Yudit is an X11 Unicode editor developed by Gaspar Sinai which may be used to edit and convert text between different languages and character sets.

Site of the month
Linux Focus
Linux Focus (http://mercury.chem.pitt.edu/~angel/LinuxFocus/) is a freely available Linux ezine, written by and for Linux users. This online magazine is full of detailed articles relating to all things Linux, with each issue focusing on a particular area. Linux Focus issues may be browsed via the Web or downloaded for offline reading.

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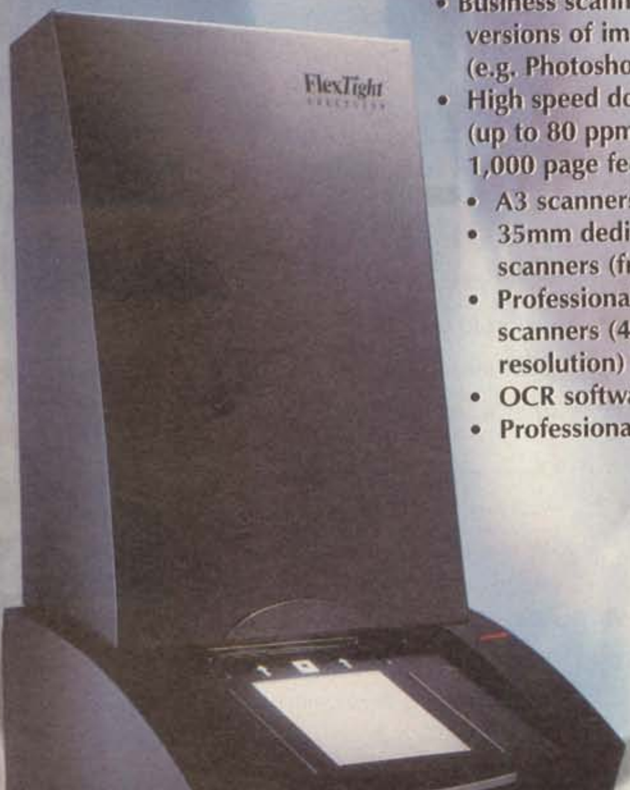

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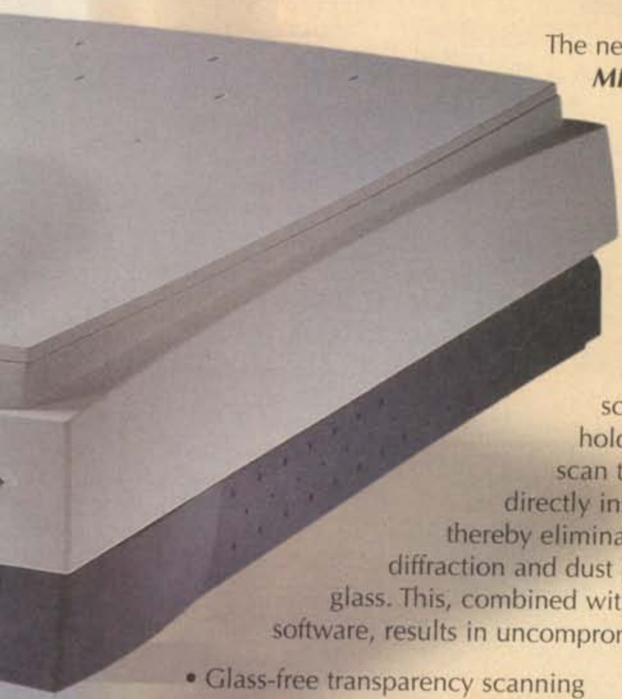

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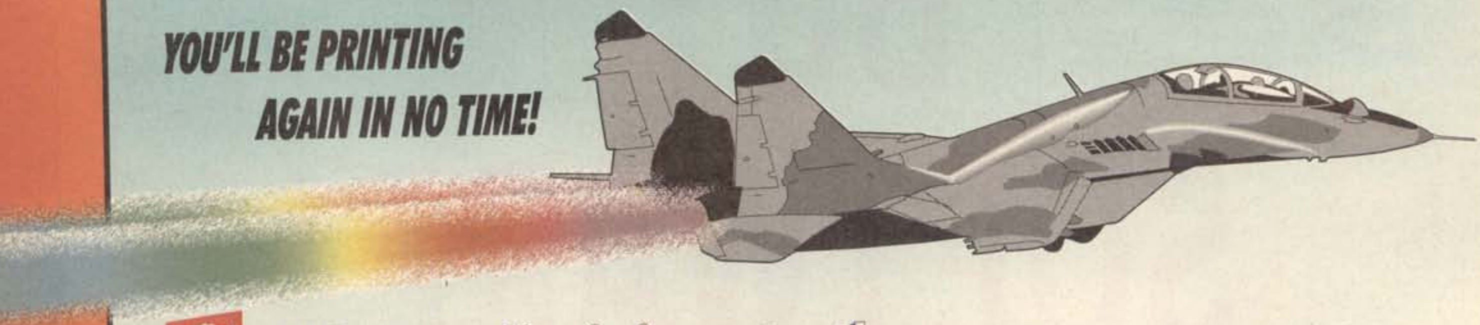

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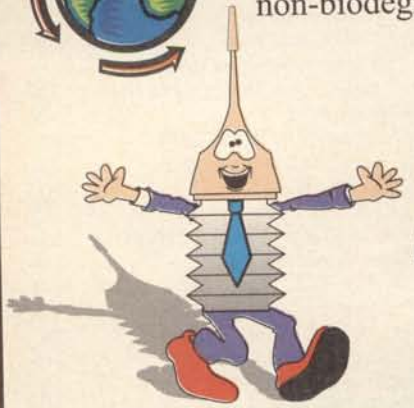

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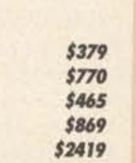

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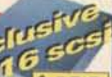

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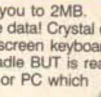

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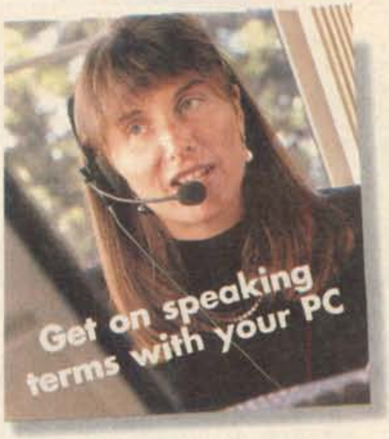
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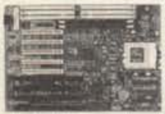

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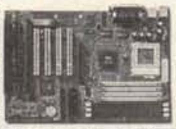

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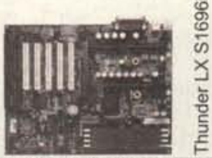

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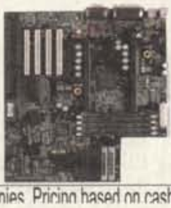

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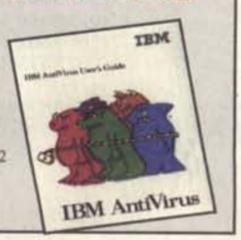

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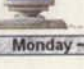

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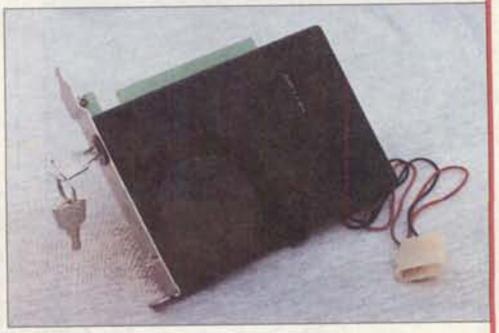

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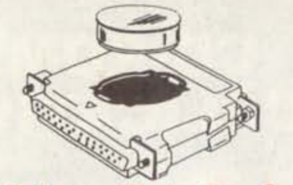

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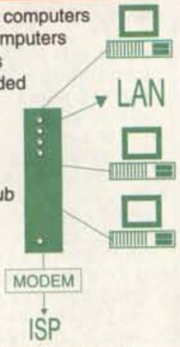

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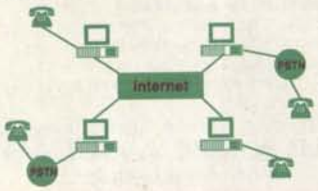

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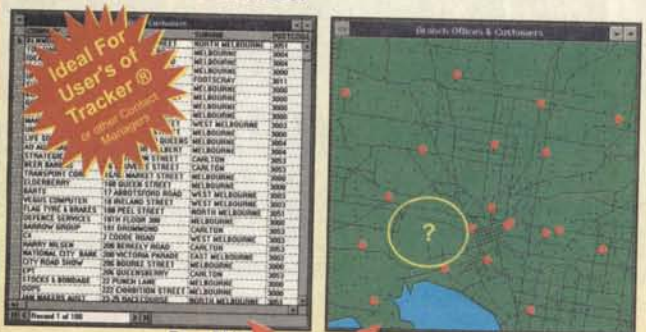
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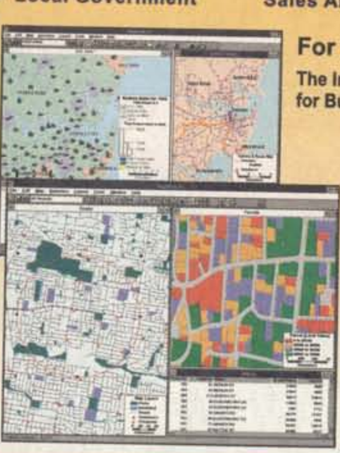

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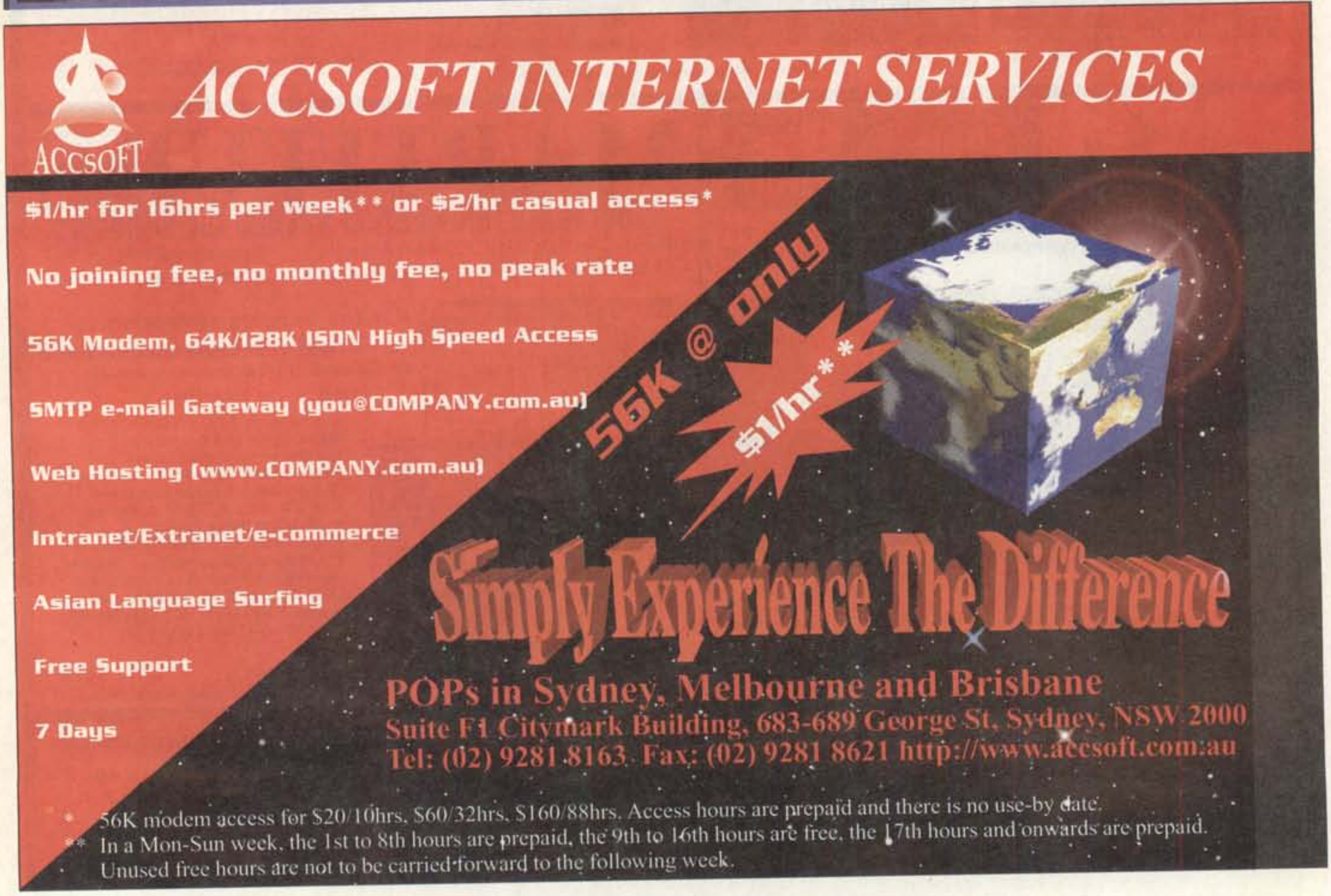

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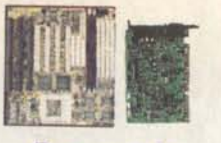

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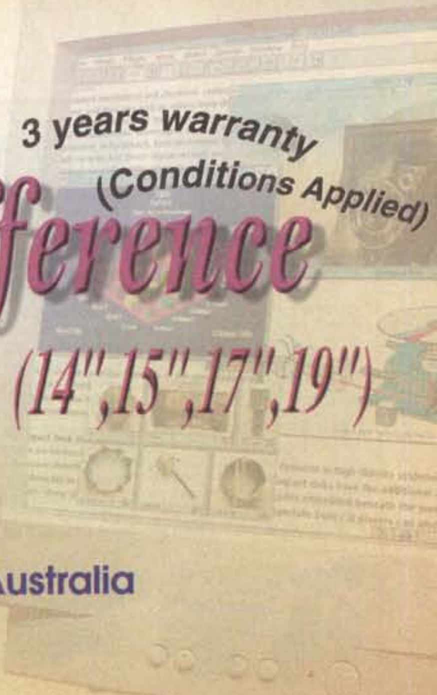

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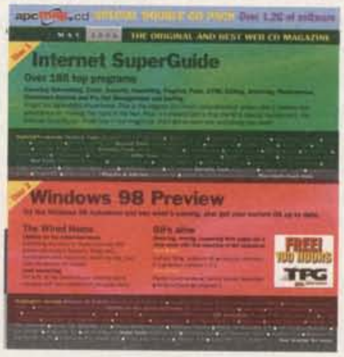
apcmag.cd and our special bonus CD

The cover discs this month have three main aims:

- To provide fast, easy access to the files and resources we talk about in *APC*;
- To make it easy for our readers to get on the Internet so they can use our new interactive Web site;
- To provide cheap and convenient access to the most popular downloads.

Our usual kit contains browsers, file-transfer programs, Mail and News readers and much more for each of the major operating systems. To make it as easy as possible for readers to get online, we've also included reader offers and a sign-up kit.



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Using the CDs

Everything you need to use the CDs has been created in HTML. You don't need any special software to access the discs, other than a standard browser, and they will work on most common platforms.

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While we've taken every care to ensure that the software provided is useful and that it works, we cannot accept responsibility or liability for any of the products included.

How to run the CDs

Windows 95 and NT users

These CDs use an AutoRun feature for Windows 95 and NT systems. Just insert one of the discs and your browser will automatically load with the front page.

Note: First-time users will be prompted by a browser set-up program (SETUP32.EXE) which will allow you to install a browser or update your current browser. This program is only loaded once, and subsequent use of the CDs will automatically start your installed browser.

Win 3.x, OS/2, Mac, Linux

Simply launch your favourite browser and load the file DEFAULT.HTM in the root directory of the CD.

If you don't have a browser, run the file INSTALL.BAT in the root directory of the CD.

The CDs have been tested using Netscape Navigator 3.0 and 4.0, and MS Internet Explorer 3.0.

……

Conditions of Entry

Instructions on 'How to Enter' form part of the Conditions of Entry of all competitions in *APC* May. Entry is free and open to all residents of Australia other than employees of ACP Publishing Pty Ltd (ACN 053 273 546), suppliers of competition prizes, their families and associated agencies.

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MicroGram Computers

Internal UPS & Power Supply

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Cat. No. 8498	**UPS / PS (PS/2) Int 500VA/300W**	$429
Cat. No. 8588	**UPS / PS (ATX) Int 500VA/300W**	$399
Cat. No. 8499	**UPS / PS Internal RUPS S'ware**	$99

PCI Video Capture Card

The PCI Video Capture card is WIN 95 Plug & Play compatible for easy installation & setup. Utility software provides full screen (640 x 480) or any size window live video display. It includes an API to enable developers to integrate it into their applications. Connections on the card are Composite Video-In (RCA Phono-Plug), S-Video In and an 8 pole mini DIN connector.

Cat. No. 3358	**PCI Video Capture Card**	$179

Headset and Microphone Combined

Hands free operation makes this lightweight & compact headset a must for Internet phone and MicroSoft's Netmeeting, etc. Comprises a condenser microphone & stereo headset which attaches to a standard sound card.

Cat. No. 3310	**Headset & Microphone combined**	$19

VGA Monitor Splitters

These splitter modules enable up to 8 monitors to simultaneousy share the information of a host computer. The ideal way of providing multiple displays in training rooms, airport terminals, stock rooms, clubs, etc. The splitter may be up to 15m from the computer while the monitor may be up to 100m from the splitter for the 2 way module and up to 50m for the 4 and 8 way modules.

Cat. No. 3070	**Two Output**	$269
Cat. No. 3055	**Four Output**	$336
Cat. No. 3056	**Eight Output**	$574

Converter SVGA to RGB

Allows the use of an RGB monitor with either VGA or SVGA output. It is designed for high resolution graphics monitors and has the H and V synch signals added to the Green video channel. RGB to SVGA converters are also available.

Cat. No. 15063	**SVGA to RGB Converter**	$189
Cat. No. 15064	**RGB to SVGA Converter**	$189

Automatic Parallel Switch Box

Connects 2 computers to 1 printer and automatically switches according to requirements. No external power supply is required. All connectors are DB25 female. A four way model is also available

Cat. No. 12013	**Switch Box Parallel 2 to 1 Auto**	$26
Cat. No. 12014	**Switch Box Parallel 4 to 1 Auto**	$51

PCI Plug & Play Printer Cards

Available in either 1, or 2 port versions, these PCI bus PnP bi-directional parallel ports have an 83 byte FIFO buffer and are able to replace faulty motherboard printer ports as LPT 1/2. Support is provided for DOS, Win 95 & NT.

Cat. No. 2618	**1 Port Printer PCI PnP**	$185
Cat. No. 2619	**2 Port Printer PCI PnP**	$225

Multimedia Disk Accelerator

Designed for multimedia, video-editing and advanced graphics applications. A low cost, flexible, and powerful bootable storage solution that links up to four (expandable to eight) high capacity Ultra ATA or EIDE drives together as one huge drive C: on a PCI system Features include:

- Provides "on-the-fly" data protection
- Supports up to 50MB/sec burst and 20MB/sec sustained data transfers
- Provides RAID levels 0, 1, and 0/1 support
- Supports Windows 3.11, 95 & NT, OS/2, etc

Cat. No. 2638	**Multimedia Disk Accelerator**	$285

Calculator Keypad

Ideal for POS and industrial applications! This 26 key calculator keypad has an LCD display allowing entered digits to be visually verified before "sending" the data to the PC. It connects via the standard keyboard socket. Features include:

- Operates as a stand alone calculator & clock when off-line
- "RND" key for full, cut, round 4/5 decimal display
- "Send" key to send calculated results to PC

Cat. No. 8486	**Calculator-keypad**	$155

Multi I/O ISA Card

A versatile interface card that supports 2 FDD, 2 HDD As well as 2 16550 compatible serial ports, 1 ECP/EPP printer port and 1 games port.

Cat. No. 2055	**Multi I/O Card ISA**	$45

Long Range CCD Bar Code Scanner

Scan from contact to 100 mm! A low cost, high performance CCD scanner offering variable width and depth of field as well as a superior scanning rate. Equipped with focus illumination, it enables you to read marginal density and coloured labels with very flexible reading angles. It supports most common symbologies and the keyboard wedge cable is easily detachable.

Cat. No. 8489	**CCD Bar Code Scanner Long Range KB**	$469

Ultra High Speed Serial Card

Break the barrier with this two port card featuring 16650 UART chips with 32 byte FIFO buffers. It provides interrupts 3, 4, 5, 7, 9, 10, 11, 12 & 15 as well as being configurable as COM 1,2, 3, 4, 5, 6, 7 or 8.

Cat. No. 2333	**Two Port 16650 Serial Card**	$159
Cat. No. 2239	**Two Port 16550 Serial Card**	$99

Two Port USB Card PCI

Provides 2 USB ports with a bandwidth up to 12Mb/s. Supports real time dynamic insertion and removal of up to 127 devices.

Cat. No. 2622	**Two Port USB Card PCI**	$99
Cat. No. 9093	**Universal Serial Bus Cable**	$12.95

VGA to Video Converter

High quality at an affordable price, this external unit does not require software drivers & supports up to 1024 x 768 with true colour for both PAL & NTSC systems. Connect to IBM, Macintosh or NEC computers. The output can be viewed on a monitor & TV simultaneously. Connections are composite video, S-VHS and Analog RGB (15kHz). The TV display can be frozen while the presenter prepares the next screen.

Cat. No. 3102	**VGA to Video Converter - External**	$499

SIMM RAM Tester

Quickly identify the size & configuration of memory as well as identifying true or fake parity. This RAM tester incorporates a microprocessor and a programmable delay line to auto test & display information. SIMM size may be 64K to 16Mb in 30-pin format, or 1Mb to 32Mb in 72-pin format. The test speed can be adjusted from 40-120 ns with a resolution of 1ns.

Cat. No.3174	**RAM Tester**	$1499

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Windows NT is becoming the biggest kid on the block. Check out these tomes written for system administrators.

Windows NT

Inside Windows NT Infrastructures

Written by an architect from Microsoft's Windows NT development team, this book provides a clear, structured picture of the Windows NT networking infrastructure. *Inside Windows NT Infrastructures* helps you and your organisation get the most out of your investment in Windows NT and demonstrates how to create a well-defined and manageable network infrastructure.

The 450 pages cover how to effectively plan and design your network, including how to anticipate performance and security issues. Detailed discussions focus on routing, domain models, leveraging the Internet and network administration.

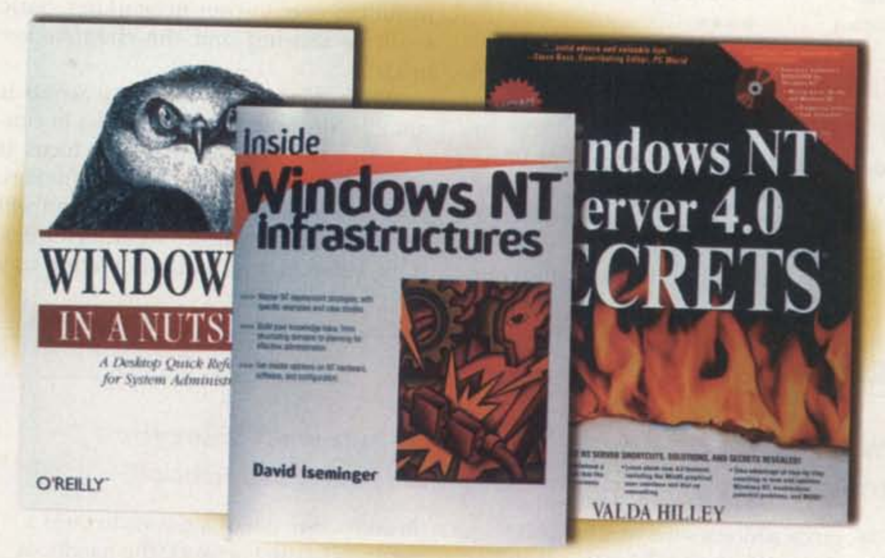
For novices, this book provides easy-to-understand technical information ranging from how IP works to replacing hardware routers in favour of software routers. It helps simplify the very complex task of getting it right the first time.

For network administrators and communications analysts the book highlights how they can access the full potential of their networks by finetuning specific areas such as setting up automatic IP allocation for clients or turning a Windows NT machine into a single application appliance, such as a browser.

There are useful tips to summarise each concept, which are complemented with network diagrams and examples of the Windows dialogs being discussed.

This book covers environments as diverse as simple dial-up networking to full-strength enterprise-wide corporate networks. A useful addition to your bookshelf.

Christopher Flynn



■ Author	David Iseminger
■ Publisher	John Wiley & Sons
■ Distributor	Jacaranda Wiley
■ Phone	(02) 9805 1100
■ Price	$72.95
■ ISBN	0-471-24276-4
■ Rating	★★★★★

Windows NT in a Nutshell

Unlike encyclopedic titles, this book is a convenient size to keep handy. It's especially useful for those responsible for administrative tasks such as managing a printer, or those who are sometimes called upon to perform more complex system administration activities under the telephone guidance of a technical specialist. As it covers both NT Server and Workstation, it will be of value in any office using NT.

The convenient thumb index to sections and highlighted index pages make it easy to find the required material. Sections on the control panel, administrative tools and accessories include graphical representations of the menu hierarchies (overflowing a double-page spread in a few complex cases such as Server Manager) which are, where appropriate, keyed to the text. Remote access service and dial up networking are dealt with at some length.

Along with basic descriptions of commands, Pearce provides helpful tips — for example, using the Network Control Panel's Move Up/Down command to place the most commonly used protocol to the top of the list may improve performance — and distilled experience, such as the most likely cause of a certain error message. The final chapter, 'Uncommon Sense', presents "various procedures that may not be intuitive to the new or casual user" such as the need to reapply a service pack if an optional part of NT is subsequently installed.

The typography is easy on the eye: a monospaced font is used for CLI commands (with parameter placeholders in

Guide to ratings

★	Stunningly awful
★★	Not especially stunning
★★★	Only slightly less than stunning
★★★★	Stunning
★★★★★	Stunningly stunning

italics) and the computer's response. This isn't unique, but it has been well executed. Another thoughtful touch for a reference book is a binding that allows it to be opened flat without breaking the spine, even when other books are piled on top.

Stephen Withers

■ **Author**	Eric Pearce
■ **Publisher**	O'Reilly
■ **Distributor**	Woodslane
■ **Phone**	(02) 9970 5111
■ **Price**	$39.95
■ **ISBN**	1-56592-251-4
■ **Rating**	★★★★

Windows NT Server 4.0 Secrets

If delving deep into the innards of Windows NT Server is your cup of tea, then *Windows NT Server 4.0 Secrets* is sure to sate your very technical appetite.

With system administrators moving across in droves from Unix to the friendlier world of Windows NT, this book begins by offering advice on formulating a blueprint for a successful Windows NT network as well as how to go about designing, laying out and implementing it properly.

While this book is, in theory, thorough enough for beginners wanting to learn NT networking basics, make no mistake, it is in fact a beginners book for intermediate and advanced NT users. Covering networking basics like cabling and choosing a network topology, it also discusses various network options, including peer-to-peer networking, basic resource sharing and the client/server model.

While *Windows NT Server 4.0 Secrets* is suitable for those simply wanting to connect two NT PCs together, the focus is really on small-to-medium businesses. The book assumes that the operation will be big enough to warrant securing the network, catering for a host of differing user rights and even remote access to the network.

There is a generous Internet-related section towards the end of the book that covers basics such as configuring the network for Internet access, and higher end functions like setting up your own World Wide Web HTTP server. Only advanced users are advised to venture that far.

Details of creating WAIS and WINS servers are included, but like the rest of the book it is very text heavy and assumes a technical mind — so don't expect the authors to hold your hand by including lots of pretty pictures.

Samantha Amjadali

■ **Author**	Valda Hilley
■ **Publisher**	IDG Books
■ **Distributor**	McGills Bookstore
■ **Phone**	(03) 9602 5566
■ **Price**	$99.95
■ **ISBN**	1-56884-717-3
■ **Rating**	★★★★★

In short

Windows NT 4 Administrator's Survival Guide

This guide addresses the new features included in Windows NT Server 4.0 and will serve as a valuable resource for system administrators implementing and managing an NT network.

■ **Author**	Rick Sant'Angelo
■ **Publisher**	Sams Publishing
■ **Distributor**	Prentice Hall Australia
■ **Phone**	(02) 9454 2200
■ **Price**	$79.95
■ **ISBN**	0672310082

Peter Norton's Maximizing Windows NT4 Server

This title explores everything from interface issues to advanced topics such as client server networking, security, and troubleshooting.

■ **Authors**	Peter Norton, Todd Brown, R Publiosi
■ **Publisher**	Sams Publishing
■ **Distributor**	Prentice Hall Australia
■ **Phone**	(02) 9454 2200
■ **Price**	$99.95
■ **ISBN**	0672309874

Windows NT Server Security Handbook

In addition to discussing ways to build a secure NT-based network, this handbook also explains adding NT to NetWare and Unix networks.

■ **Author**	Que Development Group
■ **Publisher**	Que Publishing
■ **Distributor**	Prentice HallAustralia
■ **Phone**	(02) 9454 2200
■ **Price**	$59.95
■ **ISBN**	078971213X

Windows NT Server 4: Remote Access Services & Communications

This complete reference work for Windows NT remote access and related communications technology explains the finer points of increasing efficiency and effectiveness of the NT Server administrator.

■ **Author**	Barrie Soskinsky
■ **Publisher**	New Riders Publishing
■ **Distributor**	Prentice Hall Australia
■ **Phone**	(02) 9939 1333
■ **Price**	$114.95
■ **ISBN**	1562057359

Special Edition Using Windows NT Server 4

As a high-end tutorial, this book will appeal to the reader who not only wants a reference book, but also a compelling approach to implementing Windows NT Server.

■ **Author**	Roger Jennings
■ **Publisher**	Que Publishing
■ **Distributor**	Prentice Hall Australia
■ **Phone**	(02) 9454 2200
■ **Price**	$79.95
■ **ISBN**	0789713888

Inside Windows NT

This second edition has been revised, updated and expanded to include coverage of the file system, as well as comprehensive information on Windows NT 4.0. Readers will discover a detailed, under-the-hood investigation of the NT internals and associated coding implications.

■ **Author**	HelenCuster
■ **Publisher**	Microsoft Press
■ **Distributor**	Woodslane
■ **Phone**	(02) 9970 1555
■ **Price**	$99.95
■ **ISBN**	1572316772

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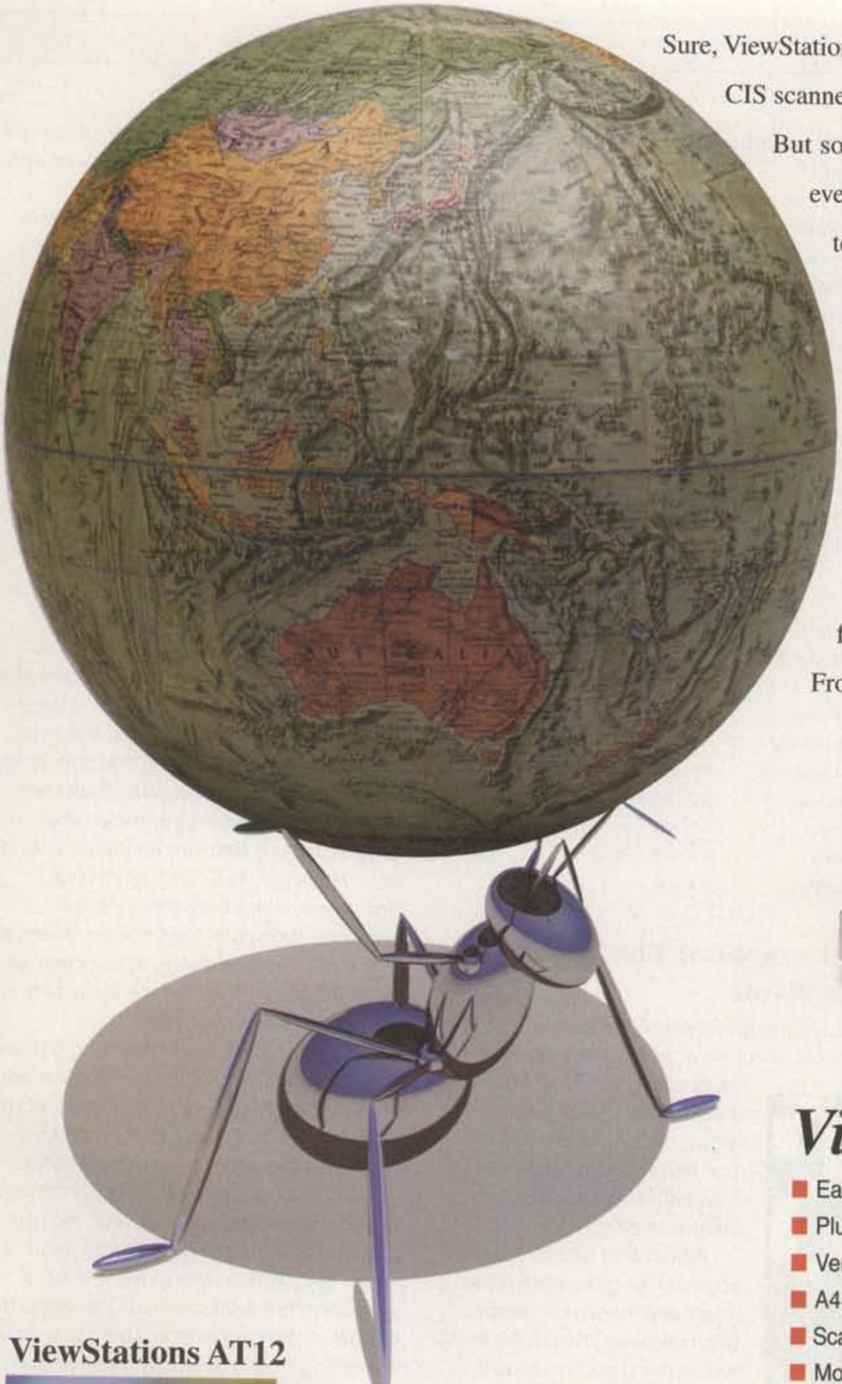

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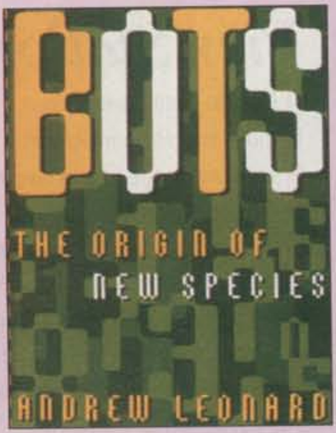
Perspective: Bots and cyberspace

Bots: The Origin of New Species

Bots are software versions of mechanical robots, which are "supposedly intelligent, autonomous, endowed with personality, and usually, but not always, perform a service". Unlike the robot in 'Lost in Space', bots "bounce off communication protocols and operating systems" in cyberspace. They entertain, work for, play with, and annoy us, and are, most likely, precursors to the intelligent agents we need to cope with information overload. From the simple log-on script used to dial your email, to the mailbot that filters your junk mail, to the search engines on the Web, bots are everywhere.

According to the author Andrew Leonard, bots are connected to humans as their creators. Spawned in the habitat of early MUDS (multiuser domains, developed in the '70s), interactive games like Zork, and experiments at the University of Austin, Texas, bots evolved from text, to graphics, and finally a social interface. Meet chatterbots like Eliza, an early experiment in human/bot relations, or Julia, dubbed by *Wired* magazine as a "hockey-loving, ex-librarian with attitude"!

Leonard then chillingly reveals that bots have a dark side. "Bots may have originally evolved as playthings, as experiments in artificial intelligence, or as solutions to problems arising in complex computer-created environments", he writes, but "bots will exemplify all our deepest hopes and fears". Bots originally thrived in the deliberately uncontrolled Internet Relay Chat environment of the mid-1990s, shared by like-minded individuals operating in a "gift economy".



Authors willingly submitted to behavioural protocols to protect their shared information in the collective interest. Now, conflict between hobbyists and the serious marketplace has, Garden of Eden-like, corrupted this early innocence. After all, "one computer will do as it is told. But a million computers linked together, responding to the needs and desires and obsessions of a million people, will not".

This book recounts myths about bots and intelligent agents, and provides a glimpse of the fun, frustration and mystique normally enjoyed by "teenage chat room lurkers", or "top-flight computer scientists". It gives an informed view of the issue of free speech versus nuisance control in an Information Age. Leonard's message is that bots are a form of life, with all the "multiple solutions, multiple approaches, and multiple choices" they present. Like the humans who created them, both good and evil bots must compete, Darwinian-like, in the cauldron of life.

This title is fun, challenging, well designed and written, and easy to read. Go for it!

Wendy Bell

■ **Author**	Andrew Leonard
■ **Publisher**	Hardwired
■ **Distributor**	Woodslane
■ **Phone**	(02) 9970 5111
■ **Price**	$39.95
■ **ISBN**	1-888869-05-4
■ **Rating**	★★★★

Cyberspace: The World in the Wires

Since the publication of William Gibson's seminal novel *Neuromancer* in 1984, the word 'cyberspace' has been used to describe the convergence of computers and virtual reality technologies. But how will it impact our lives, culture and society?

Author Rob Kitchin bases his approach to cyberspace on an integrated theoretical perspective, combining two of the four well-known traditional modernist approaches — political economy and social constructivism — with aspects of postmodernism, which fundamentally sees technology as an agent of change. Therefore, while he does not take a Utopian perspective on the role of cyberspace in everyday life, he does not necessarily view it as a bad thing. He is optimistic that cyberspace will do more good than harm, but isn't as 'intoxicated' as some futurists.

Kitchin interweaves the themes of society, culture, politics and economics to shed light on the impact of cyberspace technologies. They are not, he argues, separate entities viewed independently; they are interdependent. This line of thinking presumably stems from a change in Kitchin's personal life during the incubation of the book, when he moved from England to a village just outside Belfast in Northern Ireland. As he observed, in Northern Ireland, media hype — unlike in the US — has not created a society of people desperate to get online. The people of Northern Ireland have deeper issues on their agenda. This new awakening would no doubt have influenced Kitchin's underlying philosophy: "The way in which cyberspace will impact our lives needs to be put into a macro context; that is, the way in which we live our lives."

Kitchin explores three reasons as to why cyberspace is providing an alternative basis of communication, work and leisure, and at the same time, debunks the hype. First, Cyberspace is altering the time-space continuum; the proliferation of telecommunications networks has meant that geography and time are no longer boundaries. However, as Kitchin points out, "location will not become irrelevant because cyberspace does not annihilate all of the other determinates of commercial location such as face-to-face social networks, and access to materials".

Second, cyberspace is changing the basis of communication. Unlike traditional mass media where the editor or producer decides what people can read or hear, in cyberspace, the consumer becomes the editor.

And third, it is argued that cyberspace is blurring the boundaries between the real and the virtual. Kitchin says if you 'hold' a virtual glass with a data glove, it is not a simulation but a substitution. Therefore, the danger in the new world is that many of us are willing to accept a copy as an original.

Anyone intrigued with the media hype surrounding cyberspace will enjoy this comprehensive analysis. While it has a strong theoretical base, its jargon-free style makes it accessible to a wide audience.

Cathie Kennedy

■ **Author**	Rob Kitchin
■ **Publisher**	John Wiley & Sons
■ **Distributor**	Jacaranda Wiley
■ **Phone**	(02) 9805 1100
■ **Price**	$45.95
■ **ISBN**	0-0471-97862-0
■ **Rating**	★★★★

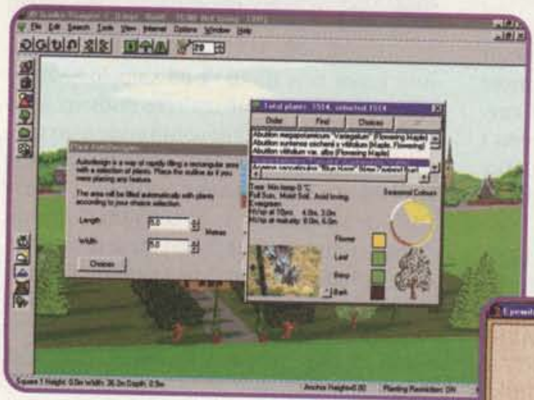
Learn the language of the natural world, or try to work out Mandarin. **By Jeremy Torr**

Nature lover

3D Garden Designer 3

Europress is a well-established UK software development company which specialises in niche market programs. This package is aimed at helping budding green fingers lay out and plan a garden with the best chance of success and eye appeal. The basic building blocks such as land, backdrop, buildings and environment can all be specified, but surprisingly the basic soil type and local climate are not options. As these are absolutely central to any planned garden, it is a surprising omission.

The program includes a wide range of plants and their characteristics, and the would-be gardener can plonk them in the soil wherever they wish and watch them grow in accelerated time. Very nice. In terms of actual help in producing a garden, however, the program isn't that much more useful than a set of Letraset stick-on images that you rub onto a horticultural backdrop. Little interactive or context-sensitive information is given on light, shade, drainage and ongoing planning, and as any gardener knows, these are vital to a healthy layout.



Upsides to the program are the ability to impose a jolly English backdrop of spires and fleecy clouds, zoom in and out and spin things around as you zoom, and look at a series of extremely brief and flat cameos from some English gardens. You can even fly over the whole plot in your own virtual helicopter. But when you realise your computer garden is populated with lumpy, monochromatic trees, flat lawns and unfeasibly lurid brassicas, you will probably decide your time would be better spent in a real garden getting your fingers dirty, rather than in front of the PC pottering about in virtuality. Not really very useful.

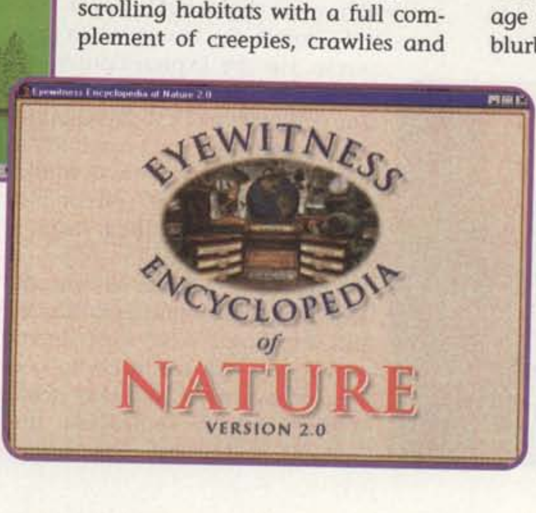
Publisher	Europress
Distributor	Europress Australia
Phone	(02) 9748 4847
Price	$49.95
Requires	486/100, Windows 95, 8M to 16M RAM, 2x CD-ROM drive, 1M SVGA
Rating	★★

Eyewitness Encyclopedia of Nature 2.0

Specifications first: three hours of audio, 50 videos, 73 animations, 850 full-colour photos, 200,000 words. That's what you get with the latest version of Nature from Dorling Kindersley. But it's how DK puts the information across that's the real delight. As usual, DK has hit the spot with a superb cross-section of the curious, the amazing and the informative, all linked together by a superb interface, point-and-click simplicity and some of the best cross-references around.

It kicks off with a whole naturalist's den of options, from simple classifications such as reptiles, plants or insects, right through to scrolling habitats with a full complement of creepies, crawlies and bities. These include deserts, coral reefs and mountains, and are a superb way to browse for information about the way ecosystems work — and their sometimes cruelly efficient food chains. There are also some less onerous options in the form of quizzes, where a close-up of the spike-headed katydid is guaranteed to confuse the keenest observer.

The program also offers an engaging and brilliantly recorded series of animal and bird calls, pop-up explanations, and links to related areas of the natural world. This last aspect can get a bit annoying, however, as the disc uses separate windows for all links — just as you are reading about the hooded crane, a 'Want to Know More?' box pops up unbidden over the text and gets in the way. This can get a bit tiresome. Overall, brilliant graphics, superb navigation and a good soundtrack. Not to be missed.



Publisher	Dorling Kindersley
Distributor	Roadshow Interactive
Phone	(02) 9552 8700
Price	$89.95
Requires	486, Windows, 8M RAM, 22M hard drive space, 2x CD-ROM drive, SVGA
Rating	★★★★★

Lin Lin Teaches Mandarin

Aimed at the beginner, this is one of a range of titles from this publisher teaching European and Asian languages. The package has been designed, according to the blurb on the pack, for Australian curriculum requirements and has been put together with some local and overseas experts to make sure it does the job. If I were a Mandarin speaker, I think I would be quite impressed. As an English speaker, I was simply confused by the immersive teaching style.

Although the program introduces a whole range of words in Mandarin, and links them with easily recognisable icons for numbers, animals, places and other bits and bobs, the amount of written or spoken English explanation was so

Interactive News

● At last the waters have parted and a real live DVD-RAM drive has surfaced in the form of the Hitachi GF1000. This is a standard-format 5.25in drive unit, and comes with a standard ATAPI (EIDE) interface, which means it can slot straight into any spare bay with no extra cabling. External and SCSI versions are also available. Hitachi claims transfer rates of up to 1.4Mbps for DVD-ROM and 2.8Mbps for CD-ROM, and the unit will cope with CD audio, CD-ROM, CD-R, and CD-RW all in the one drive. DVD capacities are currently 2.6G for standard single-sided discs, and 5.2G for the double-sided tray-mounted kind. First impressions are of a pretty slick and useful unit — but with the new Sony floppy-style drive, Zip drives and Imation drives all vying for the same market, competition is likely to be hot. The CD compatibility of DVD may still yet sway the market.

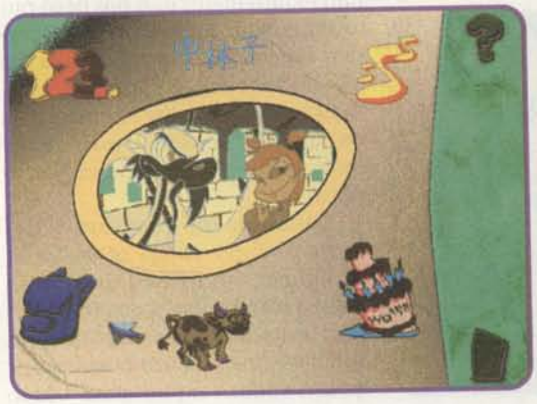
● Sharp has shown Nokia's overweight Communicator a clean pair of heels with its new MC-G1 phone organiser. Combining a GSM phone and a Pilot-like organiser in one neat pocketable package, the MC-G1 allows basic handwriting (although not recognition — a pop-up keyboard and keypad provide data entry), all the usual time management, address and memo options, plus a link to your PC for running a special set of companion software. With built-in SMS, two hours' talk time and 45 hours' standby, it may actually be usable on the move.

● Also in the mobile communications area, both Ericsson and Nokia have a plug-in PC Card ready to roll which converts any Windows CE machine into a mobile phone, GSM-style. The PC Card holds a SIMM card, and draws power from the host CE machine, which it also uses as a dial pad and (if required) Web browser screen. If the user wants to simply talk on the phone, a tiny earplug and microphone plug into a special socket on the end of the GSM card itself. Very neat stuff, and according to initial reports, not too pricey either. Apparently the major cost of many phones is the casing, keypad and display, not the electronics.

● Lastly, the war to win the SOHO print desktop is getting hotter by the minute. Canon has just released an all-in-one unit which can fax, print, scan and copy, and also produce very reasonable photo-quality images. Called the MultiPASS C20, the gadget will sell for a wallet-tickling price of $899. Aimed at the space-conscious desktop and SOHO notebook user, the MultiPASS is likely to spawn a whole batch of lookalikes in the coming round of autumn model releases.

little as to be nonexistent. The introductory menu and the exit both fling the user straight into 'Yes' and 'No' (at least I presume they were 'Yes' and 'No') options with no English subtext, while the Mandarin words themselves are spoken at normal pace. Also, there is no option for the user to speak the words back as reinforcement. The cartooning and menu options are simple and well explained in the disc case booklet (there is no separate manual), but to a large extent the user has to navigate by feel around the options and games. Adding to the difficulty, the cartoons are occasionally so cartoony that you wouldn't know what they were in English let alone Mandarin.

This disc could be quite useful as long as it was used to complement a classroom experience. However, in my case it felt less like immersive learning and more akin to drowning — I was certainly floundering from very near the verbal changing rooms.

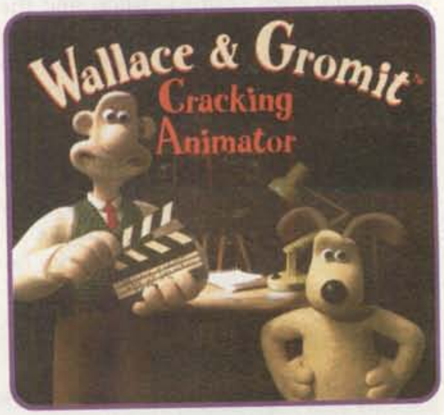


Publisher	Smarty Pants Publishing
Distributor	Ashton Scholastic
Phone	(04) 3283 555
Price	$59.95
Requires	486, Windows, 8M RAM, 2x CD-ROM drive, 1M SVGA
Rating	★

Wallace and Gromit Cracking Animator

This CD-ROM is a superb waste of time. It offers nothing useful, it actually reduces your useful computer time, and it certainly doesn't offer anything you haven't seen before. Yet if you love those perky plasticine perishers just the teeniest bit, you will have no choice but to buy it. Wallace and Gromit are conveyed to your screen via the Expressionator, the Scene-O-Matic and the Customatic. The first allows you to flip Gromit's ears up and down and control Wallace's cheesy grin on demand. Then, and even better, you can play back a little video of them doing it. Useless but riveting.

The Scene-O-Matic lets you put together mini-animations using the full Aardman/W&G cast during which you can control who goes where, says what and does what. Again, totally pointless and immensely engaging. The Customatic takes this theme one step further by allowing you to set up screensavers in a variety of ways, either using your own animations as the backdrop, or opting for the included screensaver games. These include such delights as the Jam Catapult (where you try to hit flying toast slices with jam splodges), Porridge Preston (fire the airborne porridge gun at Preston's jail break truck), and Bottled Feathers (try to capture the escaping Feathers in a milk bottle).



A top value, superbly British piece of utterly pointless time-wasting.

Publisher	BBC
Distributor	Roadshow Interactive
Phone	(02) 9552 8700
Price	$39.95
Requires	486, Windows, 8M RAM, 2x CD-ROM drive, VGA
Rating	★★★★

What a croc!

Classic stories and classical stories — games legends are made of this.

Croc: Legend of the Gobbos

The hero of this hugely entertaining game is a green crocodile which waddles its way through more than 250 locations over 45 richly detailed levels. He can also run, swing, swim and even fly.

It's a platform game ported over from the Playstation, where the Croc character was serious competition for Nintendo's Mario. And it seems to have lost nothing in the transition to the PC. The setting is Gobbo Valley, home of the lovable gerbil-like Gobbos. These short, furry people are very sociable, although they're pretty dumb and have happily bumbled along for generations under their ruler, King Rufus the Intolerant. Their peace-loving lifestyle has now been shattered by the wicked Baron Dante, who has captured King Rufus and taken over the Valley, aided by the villainous Dantinis, who throw captured Gobbos into cages.

Croc is leading the rebellion against the Baron and his Dantinis, and has some pretty slick tricks under his tail. As well as the baron there are more than 40 other hard-as-nails baddies, but Croc has his helpers, such as Beany the Bird which gets him out of trouble by spiriting him away in a shower of Magical Sparklies.

He can also make 13 different moves, including flips, jelly jumps and hand-over-hand swings, and his major weapon is a devastating tail swipe. All these moves are achieved via some good keyboard, joystick or joypad controls.

A Windows 95 DirectX game for all age groups, Croc has full support for a range of 3D graphics accelerator cards and supports MMX technology. The 3D feel is quite strong and the free-ranging movement throughout the four well-drawn islands has a nice depth. To top it all off, there are eight secret levels and an entire secret island. I found it lots of fun and definitely not just for kids.

Eric Holroyd

Distributor	Electronic Arts
Phone	(07) 5528 0500
Online	http://www.foxinteractive.com
Price	$49.95
Requires	Pentium 133, 16M RAM, 2x CD-ROM drive, DirectX-compatible soundcard and video card
Classified	G
Rating	★★★★

Hades Challenge

Stories from Greek mythology have always been popular. Many movies have been made based on these stories, and Hades Challenge is a sequel to one of them: Disney's animated feature film 'Hercules'.

Many of the movie's original character voices are included in the game. You play Hercules and help Zeus battle the wicked giant Hades and his nasty pals in a series of quests. Scattered around are a dozen or so statues of Olympian gods which you must discover, as they give vital clues.

You're helped by Phil, a cute Brooklynese wiseguy, who pops up to give useful tips at various times. A series of fun quiz-show games test your knowledge of Greek mythology and earn you powers and other items vital to the four island quests.

One of these interconnected quests contains the story of the Minotaur on the Island of Crete and the labyrinth that Daedalus built to capture it. You must acquire various items and figure out some screen puzzles so that building can proceed. In the Troy quest, the setting is the Trojan War where you line up with Helen of Troy, and see how the Trojan Horse was made. Medusa Isle involves the tale of the Gorgon goddess who had snakes for hair. You'll only get the strong magic powers and special weapons needed to defeat her through another series of puzzles. Finally, in the 'Underworld' where Hades is in his evil element, you get to use the 'hero powers' you've cleverly accumulated to defeat him and the other giants.

A hybrid CD-ROM game for Windows 95 and Macintosh, this is aimed at 7 to 12-year-olds, but that didn't stop me enjoying it. It is very well made, with strong sound and graphics, and the booklet contains hints if you get stuck.

Eric Holroyd

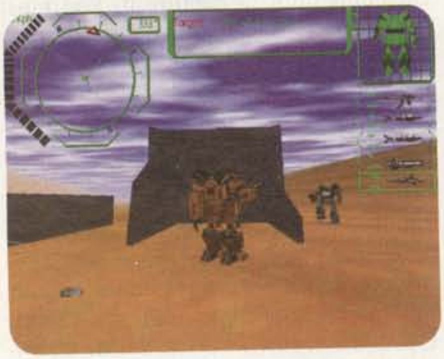
Distributor	Disney Interactive
Phone	(03) 9520 2740
Online	http://www.disneyinteractive.com
Price	$69.95
Requires	Pentium 90, 16M RAM, 4x CD-ROM drive, 16-bit soundcard; PowerPC 100, System 7.5, 24M RAM, 4x CD-ROM drive
Classified	G
Rating	★★★★☆

Heavy Gear

Just because Activision no longer holds the Battletech licence to create MechWarrior games, doesn't mean it can't create a different (but somehow similar) game called Heavy Gear.

On the land of Terra Nova the Northern and Southern armies are fighting a war. It is the 61st century, and technology has increased so much that close combat is fought in armoured battle suits that give wearers the ability to carry very heavy weapons . . . Sounds very similar to MechWarrior doesn't it? In truth, this is basically a progression from the MechWarrior series, though Heavy Gear is based on a text-based RPG of the same name.

Heavy Gear has two modes of play. The first is a collection of interlinked missions based on the story of the Northern army trying to defeat the opposing Southern army, while the second, the 'tour of duty' mode, allows you to choose from a variety of missions. You can be a member of either army, and your efforts will dictate is success in the war.



There is a lot more to controlling a gear than simply pointing it in the direction of the enemy or navigation point and turning up the throttle. Avoiding enemy fire is aided by the ability to crouch behind obstacles and strafe to the left and right. Travelling long distances can be a pain, but with your gears engaged, things speed up significantly.

The Windows 95 graphics are good, but nothing overwhelming. Sure the gears look cool, but much of the combat is undertaken in sparse areas of desert, which doesn't allow for anything fancy. The audio soundtrack sets the mood, while the sound effects — such as the shuddering steps as the gear walks, or the sound of bullets pinging off armour — certainly add to the atmosphere. Activision has provided all kinds of multiplayer support and there's an Australian server for Internet games, although when I tried to have an online game there weren't many others there.

Heavy Gear provides some fast and furious action that can be enjoyed by both MechWarrior veterans and gamers who have never experienced combat on a big machine.

Kieran McNamee

Distributor	Activision
Phone	(02) 9869 0955
Online	http://www.activision.com
Price	$89.95
Requires	Pentium 166, 32M RAM, 4x CD-ROM drive, 195M hard drive space
Classified	G 8+
Rating	★★★★

Monty Python's Meaning of Life

"Is your wife interested in computer games? Nudge, nudge, wink, wink. Say no more!" If she is, and she's a Monty Python fan, then she'll love this one. If she's not, but you are, then it's a horse of an entirely different smell, but you can play it yourself.

As a dedicated Python fan, I know the 'Meaning of Life' movie very well, so playing the computer game was a most interesting and, as it turned out, quite satisfying experience. All the movie's characters are there, plus a lot of video taken directly from the movie. The twist is that they've added a lot of new and specially created material from all the Python crew to turn it into a game.

It starts with the scene where Python-headed goldfish swim around saying 'Good morning' to each other; then you get a circular menu screen with a toilet flush chain. Choose a menu item (Middle Age, Fighting Each Other, Death, and so on), flush the chain, and a crucified figure goes down the pan.

I very logically opted for Birth to start things off, and was whisked off to the Foetus Frightening room where John Cleese and Graham Chapman are suitably gowned up to deliver the baby. This scene is even complete with the machine that goes 'ping' (the most expensive machine in the hospital). To play the game you move the cursor around until it lights up over something, and clicking produces unpredictable results.

In the school chapel scene, almost all the characters are 'active', and it's hilarious to find out what they're thinking. In the wonderful restaurant scene with the revolting fattie, Mr Creosote, you play a game of shooting plates of food into his mouth, and you can also make him chunder on the kneeling cleaning lady. I loved Michael Palin's 'Mr Hendy' character (the American tourist) who multiplies into a wonderful barber-shop choir, complete with 'Applause' signs, and of course the whole thing ends with the Grim Reaper. But not before you've had a whole lot of fun in this 'too silly' game.

Eric Holroyd

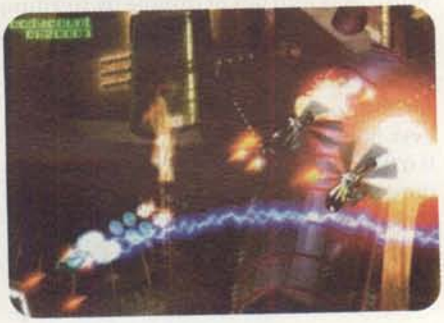
Distributor	Hilad Corporation
Phone	(02) 9700 9377
Online	http://www.pythononline.com
Price	$89.95
Requires	Pentium 90, 16M RAM, 4x CD-ROM drive, Windows 95
Classified	G
Rating	★★★★☆

The Reap

Every now and then I like to get stuck into a good old no-nonsense shoot-'em-up, and that's exactly what The Reap is. Unabashed good fun that keeps your trigger finger on the go and you on the edge of your seat.

It's a Playstation port from Finland's Housemarque — known by Internet gamers worldwide for Con Quest 2941, which has produced many games for various platforms, including the Commodore Amiga. The Reap is strongly reminiscent of the best games I remember from that machine, and lives up to the Amiga's tradition for bright graphics coupled with white-knuckle action.

You're piloting an alien spaceship, hovering above the Earth's surface viewed in 45°, sideways-scrolling perspective.



YOU
WOW!
Ralph Magazine
Surprising Ralph Magazine.
ACP025 SRVT

Coming at you in increasingly bigger waves are hordes of enemy craft spewing death and destruction from their gun barrels and rocket launchers. All this is accompanied by great sound effects, of course, including the cries of ground-based soldiers. You have the option of eight weapons, and there are various add-ons and bonuses to be picked up along the way. Needless to say, it's best to grab everything on offer, as you'll need all the help you can get.

There's a strategy element; only certain weapons will let you achieve specific goals — and it would be spoiling the game to tell which weapons do what. An AI assessment works out how you're faring in the game and uses its findings to modify the possible outcome on levels and scenes. Now that's clever, and it means the game will play differently according to the player. Unlike many earlier shoot-'em-ups, this one has both airborne and ground-based enemies. You can be shooting away at a helicopter gunship when a troop-carrying truck appears on the winding road beneath your craft and starts shooting up at you. Bombing the truck produces a spectacular explosion that leaves a smouldering crater. Arcade fans will just love this.

Eric Holroyd

Distributor	Mainstream Interactive
Phone	(03) 9879 3588
Online	http://www.mainstream.com.au
Price	$49.95
Requires	Pentium 100, 16M RAM, 4x CD-ROM drive, DirectX 5-compatible video card
Classified	G
Rating	★★★★

Games News

- Gamespy does get it wrong sometimes. A few months ago, we brought you news about the Auran exodus to Activision in the US. Well, it's time to eat a little crow. What actually happened was that four or so Auran staff were lured to Activision while the rest of the team stayed in Australia. Although the report was based on information given at the time, apologies to all the staff of Auran are in order. In fact, Gamespy was very happy indeed with this correction — as far as we're concerned, the more talented game developers that stay in the country the better. Auran has since taken on quite a few more staff from both here and overseas, and is hard at work on its next game based on the Harn universe.
- The Voodoo2 battles have only just begun, but they've begun with a bang. Along with Orchid Righteous and Diamond Multimedia, plenty of other manufacturers will have 3D accelerator cards on the shelves soon. Creative and Diamond are shaping up to be the mass-market choice, and both are trying hard to become the gamer's choice. Creative was the first to announce its 12M Voodoo2 card (see review, page 34). Diamond was quick to criticise Creative, saying that it "doesn't really understand the market". Then, in a backflip that would make any self-respecting politician proud, Diamond announced just a few days later that it would also be making a 12M Voodoo2 card. Perhaps Creative did understand the market after all.
- Diablo was one of the biggest hits of last year, and changed the way a lot of people think about RPGs. Blizzard realises just how big the sequel could be, and the publicity is flowing forth for Diablo2 despite an anticipated release date of around Christmas this year. The most encouraging news so far is that Blizzard is planning to put a lot of emphasis on stopping the Diablo cheaters that plagued Battle.net, and ruined the game for many players. They aren't saying whether player information will be kept server-side as yet, but it's sure to be something they will have to take a long hard look at. In the meantime, Final Fantasy VII, an old-school RPG that was a smash hit on the Sony Playstation, is finally about to be released for the PC, although the system requirements are going to be very high. A Pentium 166, 32M RAM, and a 3Dfx (or Voodoo2) card are the *minimum* requirements.

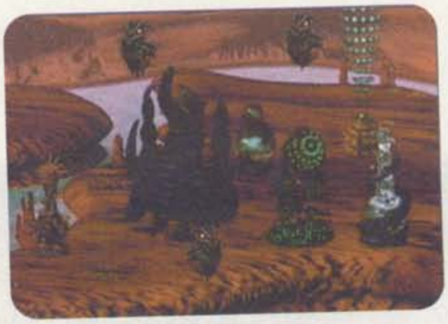
Gamespy

The Tone Rebellion

There's a strange idyllic kingdom in the nether regions of our universe wherein live four tribes of strange creatures known collectively as Floaters. They all need Tone for survival. This substance is all things to all Floaters, providing both the energy and the intelligence for them to develop their society.

As often happens in Utopian societies, someone came along who didn't want to go with the flow but decided instead to corner the market in Tone, absorb all its power for himself and become the all-powerful leader. The evil one is called Leviathan, and so far he's managed to accomplish most of his wicked will, having taken over and then banished the Floaters from this Paradise. Now he'll take over the entire Tone Universe if you don't stop him.

A Windows 95 game with great graphics and a good video intro which recounts Floater history, this is a most compelling and truly original adventure story taking in 15 graphically glorious worlds. You choose to become a member of one of the four tribes (Mystics, Seekers, Protectors and Lifegivers) then train tribe members as warriors and lead them (hopefully) to liberation by finding ancient glyphs to defeat the Leviathan. It's a good idea to try to work with the other three tribes (which are all trying to achieve the same objective anyway), but you need to bear in mind that *all* tribes need Tone to survive, and it's in desperately short supply at the start of your quest. When you discover a new source of Tone, will you share it with the others?



The habitat of the tribes is an amazing series of floating islands, which are connected by lustrous bridges of Tone energy. Before leading your tribe across a bridge, be sure to look out for deadly enemy spores. They kill on contact.

If all this sounds weird, it's meant to, as the Tone Rebellion is a quite complex blend of real-time strategy and head-scratching puzzle solving.

Eric Holroyd

Distributor	Virgin Interactive
Phone	(02) 9959 2301
Online	http://www.vie.com
Price	$79.95
Requires	Pentium 95, 16M RAM, 4x CD-ROM drive, DirectX 5-compatible soundcard and video card
Classified	G
Rating	★★★★

Shopping for religion on the Web is like visiting Grace Bros: there's an awful lot of choice out there.

A church for all reasons

www.catholic.org

Like anyone else with a barrow to push, established religious organisations have embraced the Web with gusto.

Religions get online for the same reasons any other corporate entity gets online: branding, promotion (evangelism) and sales (conversions, as well as merchandising). It's also a cheaper way for religious organisations to disseminate their teachings, although no religion has ever run a cost-per-conversion comparison of Web-based evangelism versus conventional evangelism. Suffice to say that return on investment is probably not foremost in the minds of those building religious Web sites.

Like the computer industry, the last 20 years has seen the landscape inhabited by conventional Judaeo-Christian religious groups shift radically. Once upon a time you acquired your religion from one or two big players — usually the Catholic Church or one of its Protestant twins. The change, caused by factors outside the realm of this review, saw much smaller, but exceptionally popular, Christian organisations come out of the woodwork, and today it's these churches where most of the new member growth is occurring. In a sense, then, the Catholic Church can be seen as the equivalent of IBM, and the others as the opportunists that took the basic platform and really pushed it to the people.

But even though the terrain has shifted, IBM is still the big guy in town, and so is the Catholic Church, with several hundred million individuals across the planet calling themselves believers.

A religious Web site, therefore, must perform two primary functions: first, it must provide enough information to enable a curious visitor to get an immediate grasp of the basic tenets of belief. Second, it has to provide a resource, or community, for the already converted. www.catholic.org does both well, and offers a free email service to boot.

The site is very easy to navigate and ontains an almost exhaustive list of esources for the information-hungry Catholic Web surfer. The only thing that ets it down is the lack of a comprehensive isting of regional Catholic Web pages.

Catholic ONLINE

Catholic Online...
Dedicating our online
presence to
Our Lady of Guadalupe

HOLY FATHER'S PRAYER INTENTIONS
FOR MONTH OF MARCH

Page design is modern and functional without falling victim to over-design, and surprisingly, the elaborate front page loads reasonably quickly despite the intricate graphical content.

Josh Gliddon

Online	http://www.catholic.org
Rating	★★★★

Church of Virus

The tagline for this site, and the first thing you'll see should you visit, is "Closed irrational minds may be offended. Open rational minds may be infected." You guessed it: it's time to brace yourself for some weirdness.

Church of Virus is an attempt to spread a particular psuedo-religious dogma over the Web, an experiment in building an online cult around an atheistic religion that some crackpot obviously dreamt up in their spare time. The name of the religion — Virus — comes from the idea that the religion is designed to appeal to the "rational" minded and spread among them.

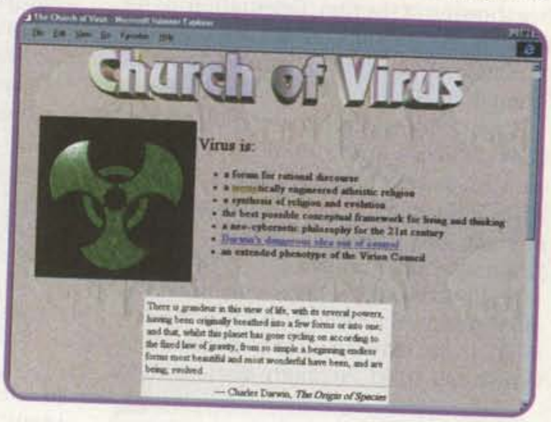
The author mounts a quasi-intellectual, almost Zen-like argument, that "the meaning of life is in general the effects of life", denying the existence of any "mystical forces" (such as a God).

The site contains pages outlining the virtues and sins of the Virus religion (reason/empathy/vision and dogmatism/apathy/hypocrisy respectively), a list of Virion saints (currently restricted to one — Charles Darwin), essays on the philosophies of the religion (incomplete when we tried to take a look) and a large section taking a general swipe at other religions and philosophies.

From a technical standpoint, the site itself is nothing flashy, with some very basic HTML and only a few pages from which to learn the 'Virion' religion. The graphics are fairly basic (are those textures from Doom that they've used as a watermark in the background?), and the site lacks any kind of fancy Java or ActiveX enhancements.

The site is actually part of a Web ring called the Ring of Truth, linking all sorts of out-there sites (including such gems as The Atheist Soapbox and the access-restricted Doc's Auto-Erotic Asphyxia Homepage). Seriously disturbing, but interesting reading if you're into exploring non-mainstream belief systems.

Church of Virus, and other sites like it, are interesting to look at if you're seeking the extreme characters and anti-establishment ideas that everyone tells us the Internet is full of. In reality, the information on the site reads more like science fiction than a bona fide religion, and in the end you're left wondering whether the author of the site believes the line he's spinning, or whether it's just some kind of bizarre social experiment to see how many people fall for it. L Ron Hubbard, eat your heart out.



Church of Virus

Virus is:

- a forum for rational discourse
- a [illegible] engineered atheistic religion
- a synthesis of religion and evolution
- the best possible conceptual framework for being and thinking
- a neo-cybernetic philosophy for the 21st century
- Darwin's dangerous idea out of control
- an extended phenotype of the Virian Council

There is grandeur in this view of life, with its several powers, having been originally breathed into a few forms or into one; and that, whilst this planet has gone cycling on according to the fixed law of gravity, from so simple a beginning endless forms most beautiful and most wonderful have been, and are being, evolved.

— Charles Darwin, *The Origin of Species*

Nathan Taylor

Online	http://www.lucifer.com/virus
Rating	★

Scientology

If you ever want to find out what Scientology is all about without enduring the discomfort of visiting the organisation's nearest church, take a trip to its Web site. It offers the real Scientology experience, with 3D tours of Scientology churches, including Saint Hill and Celebrity Centre International (although I couldn't find any celebrities I recognised).

The tours are well done, but not particularly interesting. In the Music and Lectures section, songs are available in RealAudio, including Scientology founder L Ron Hubbard's 'The Road to Freedom' in seven different languages. His entire 55-minute lecture on 'The Story of Dianetics and Scientology' is also online, as well as excerpts from other lectures.

From the front page I headed straight to the free personality test, thinking it might be a fun thing to do. When I realised I would receive, *in person*, an in-depth, accurate analysis of the results from an expert evaluator, I was too scared to submit my responses. You will have to find out how accurate it really is yourself.

The interactive sections involve a barrage of questions: the personality test has 200 questions to answer — a daunting task, even if it is all about yourself. Similarly, if you want to give your view of the site, you will have to fill out a long form on every aspect. And of course, other people's views are not shared.

Like the personality test, I found some of the sections misleading. I interpreted the free showing of the film 'Orientation' as an online screening but you can actually only register to attend at your nearest Church of Scientology (CoS).

If you're not sure where your nearest CoS is, you can find it on the Global Locator. One section also documents Scientology's infiltration into countries where it has not had a presence before, such as Romania and Mauritius.

Published online are *Freedom*, the CoS magazine, and *Psychiatry*, a Citizens Commission on Human Rights publication, with issues titled *Psychiatry destroys minds* (a campaign against electric shock treatment) and *Manipulating creativity in the name of help*.

WELCOME
TO THE NEW WORLD OF SCIENTOLOGY

Although the site has a lot of resources for practising Scientologists, there are plenty of avenues for those who know nothing of this applied religious philosophy. You can order all Hubbard's books, audio cassettes, and videos from the site's bookstore. It's definitely a Web site that aims to make money. I often followed links expecting to be able to read sections of Hubbard's books, but instead would get a short blurb and its purchase price.

The site is nicely designed with attractive graphics, and a user-friendly feel. Its content is up-to-date, and overall it is a good resource for all your Scientology questions.

Claire Waddell

■Online http://www.scientology.org
■Rating ★★★★

Surfbaud: Seek and ye shall find

If you don't understand what makes it tick, using the Internet is like walking into the world's biggest library without any access to a card catalogue. But that's what search engines are for. These diligent cyber-slaves obediently scour the Net for any word or phrase you might be looking for — and they can be highly addictive.

You know what I mean. How many of us happily log on to find even the most useless piece of information? Need a phone number? No problem, drop by the Yellow Pages Web site (http://www.yellowpages.com.au) — forget the fact that dialling 013 is a hell of a lot faster and easier. The point is, searching for information on the Web is a handy skill to have, and if you know where to look, there isn't any topic you won't be able to find.

Naturally, there's a handful of sentimental favourites that any Web-savvy surfer can reel off without even thinking — Lycos (http://www.lycos.com), Excite (http://www.excite.com), InfoSeek (http://www.infoseek.com), HotBot (http://www.hotbot.com) and AltaVista (http://www.altavista.com) are the undisputed leaders. Anzwers (http://www.anzwers.com.au), WebWombat (www2.webwombat.com.au/index.htm) and Matilda (http://www.aaa.com.au/matilda) are just some of the search engines with an Aussie accent, and although their titles are more boring than their US counterparts, nothing beats DogPile (http://www.dogpile.com) for an unusual name.

Then, of course, there are shrewdly designed pages devoted to searching several search engines at the same time (http://www.dreamscape.com/comtek/search.htm), and there is no shortage of self-proclaimed 'Ultimate Search Pages' (http://www.stud.uni-hannover.de/~neyjahr/test.htm) which offer multiple search engines from a single page (http://www.search.com).

All of these engines are suitable if you are looking for general facts and figures, but if you are after specific subjects like software (http://www.shareware.com), you might want to drop by http://www.filez.com or http://www.download.com; while Snoopie (http://www.snoopie.com/query.html) will dig through hundreds of FTP sites in order to find those elusive software gems.

Forget sifting through 50,000 or so newsgroups, the coveted DejaNews (http://www.dejanews.com) search engine will do it for you in two seconds flat. But you will have to make a separate visit to http://www.newsletteraccess.com for access to thousands of newsletters, or http://www.listz.com for even more mailing lists.

As long as you don't have spamming on your mind, you can use mail search engines to find email addresses. WhoWhere (http://www.whowhere.com/www.whowhere.com) or Four11 (http://www.four11.com) are very US-centric, but with over 6.5 million listings there are plenty of Australian entries at the fabulous Internet Address Finder (http://www.iaf.net)

Webmasters wanting to submit their sites to every search engine possible will find http://www.submit-it.com saves precious time. But if the old-fashioned honest way doesn't work, you are just going to have to cheat. Follow the advice of Search Engine Secrets (http://www.searchsecrets.com) and your hit rate is guaranteed to increase.

No matter what topic you are looking for there seems to be a search engine for it, whether it be classical MIDI files (http://www.prs.net/midi.html) and second-hand cars (http://www.autoweb.com.au), or even search engines devoted to humour (http://www.humorsearch.com) and jokes (http://www.dailyjoke.com/search.htm). About the only search engine you won't find is one for search engines!

Samantha Amjadali

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Chip Chat

Bill tin wardrobe

After last month's Piegate extravaganza, we'll try to keep the Bill Gates-related content to a minimum, but we can't resist reporting one of the Microsoft CEO's poorer attempts at humour during his flyby Australian visit. Arriving late for a Melbourne customer briefing, Gates had a mildly wacky explanation. "I was explaining the Windows DNA architecture to the Federal Cabinet, and they got into a little more detail than I expected," he said. Did we laugh? Well, to be honest, no.

Gates' visit was remarkable largely for its complete lack of content (unless you consider getting a horsewhip from Tim Fischer to be imbued with some hidden significance that escapes us). But being the world's richest man means never having to say you're interesting.

Having a jab at Jobs

By the time you read this, former Apple CEO Gil Amelio's tell-all exposé of life inside the company, *On the Firing Line: My 500 Days at Apple*, should have hit the streets. It's unlikely that people will be looking to the book for successful business strategies, but if they go looking for nasty comments about other Apple staffers, they'll definitely hit paydirt.

According to early reports, Amelio admits to being bitter over his ousting from the company, and characterises Apple founder Steve Jobs (who replaced him in the post and has become one of the world's best-known interim CEOs) as a man quick to take credit for others' achievements. "Steve Jobs now has a new talent on his résumé: displacing the CEO," he writes.

According to Amelio, Jobs also used handicapped parking areas to save himself the bother of looking for a space. We await Jobs' follow-up, *Inside the Bunker: I Hate Gil's Guts* with interest. But Jobs isn't the only one in the firing line: Bill Gates (sorry, he just keeps popping up) is described as a difficult man to partner with. "I rapidly came to realize that Bill found it difficult to meet another person halfway," Amelio writes.

Mad, bad, and your legal representative

Australian politicians certainly haven't been turning in impressive performances of late, but take heart, it could be worse. US representative Jim Traficant set a new benchmark for Net-related stupidity early this year when he announced to a stupefied Congress that one of his constituents had become pregnant via email. Yep, you read that right. No, we're not making it up.

Traficant's exact words: "Frazzled Frances Wyndham believes she got pregnant during a sexy email exchange by a paramour 1,500 miles away. That is right: pregnant. Frances said, and I quote, 'His words were so sexy, I was totally seduced.' Talk about instant connection. This is immaculate reception, Mr Speaker. And if that is not enough to crash our hard drive, think about the legal implications. What is next? Bill Gates [oops — there he is *again*] paying child support? Microsoft, my eye. Mr Speaker, it is time for Congress to act. The computers do not need a V-chip; Internet needs a chastity chip."

Search engines: And you thought we'd forgotten

We were going to dismiss the entire incident as one of those 'only in America' things, but then we decided to do a little investigating. Searching on the words 'pregnant' and 'email' but excluding the word 'Traficant', we still found around 25,000 sites, most of which can't be described in a family magazine. It's a sick world out there, kiddies.■

Contest: Get down on your knees

It was during the fifth protracted struggle between a notebook and a network card that refused to admit the existence of anything even vaguely resembling a network that the realisation first came to Chip Chat. In our long career, we have never actually managed to get a PC Card (that's PCMCIA, for those of you with long memories) to work the first time it was connected. Invariably, there was a long and miserable interlude involving old drivers, new drivers, interrupt queues and 57 compulsory reboots. Plug and Play? Shrug and Pray, more like.

But we're sure other people are worse off than we are, and we would feel a lot better if we knew exactly how much worse off. Hence this month's competition. Write in with your worst peripheral installation horror story (it doesn't have to be PC Card related, although to be honest, this may improve your chances of winning). We want all the pedantic, horrible details, especially the bits where you throw the machine across the room.

The tale of woe that makes us laugh or cry the most will receive a year's subscription to *APC*. Enter by sending email to disaster@ acp.com.au, or write to Disaster, *APC*, Level 8, 54 Park Street, Sydney NSW 1028. Entries close May 21, 1997; the winner's name will be published on our Web site. For full terms and conditions, see page 217.

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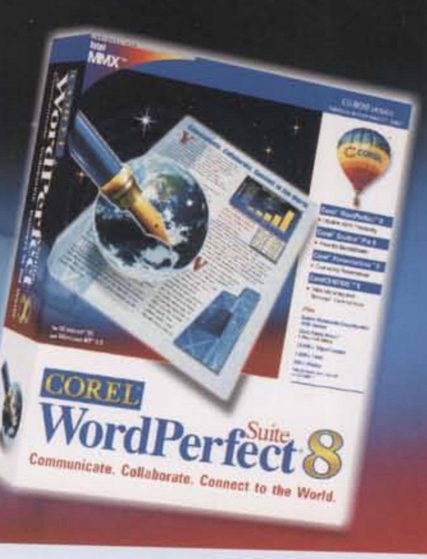

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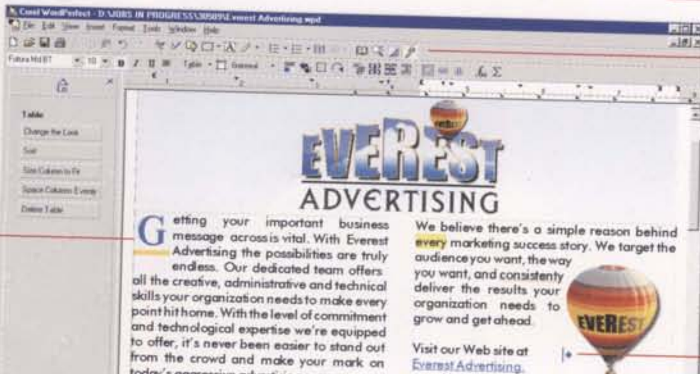

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